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February 9, 2004



BY HAND DELIVERY

The Honorable Vernon A. Williams
Secretary
Surface Transportation Board
1925 K Street, N.W.
Room 711
Washington, D.C. 20423-0001

ENTERED
Office of Proceedings

Re: Docket No. 42072, *Carolina Power & Light
Company v. Norfolk Southern Railway Company*

FEB - 9 2004

Part of
Public Record

Dear Secretary Williams:

Enclosed for filing in the above-referenced proceeding please find an original and sixteen copies of Carolina Power & Light Company's Consolidated Reply to Petition to Correct Technical Error and Petition for Reconsideration. Additionally, please find three CD-Rom's, each containing the filing in electronic form and certain associated electronic workpapers.

Finally, an extra copy of the reply is enclosed. Kindly indicate receipt and filing by time-stamping this copy and returning it to the bearer of this letter. Thank you for your attention to this matter.

Sincerely,

C. Michael Loftus

C. Michael Loftus
An Attorney for
Carolina Power & Light Company

Enclosures

**BEFORE THE
SURFACE TRANSPORTATION BOARD**

CAROLINA POWER & LIGHT
COMPANY,

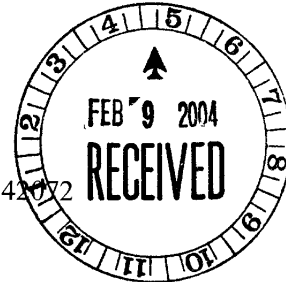
Complainant,

v.

NORFOLK SOUTHERN RAILWAY
COMPANY,

Defendant.

Docket No. 42072



ENTERED
Office of Proceedings

**CONSOLIDATED REPLY TO
PETITION TO CORRECT TECHNICAL ERROR
AND TO PETITION FOR RECONSIDERATION**

FEB - 9 2004

Part of
Public Record

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DATED: February 9, 2004

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CAROLINA POWER & LIGHT
COMPANY,

V.

NORFOLK SOUTHERN RAILWAY
COMPANY,

Defendant.

NS's Petition identifies seven categories of "technical error" in the Board's December 23, 2003 Decision ("Decision"). CP&L agrees with NS that there are certain technical errors that should be corrected by the Board, though not, in some cases, in the

amounts calculated by NS. However, several of NS's claimed errors are not errors and require no adjustments. We address each of NS's points in turn.

A. Traffic and Revenue

NS identifies two purported "technical errors" in the traffic levels for the P&SH. Neither of these alleged technical errors warrants revision of the Decision.

First, NS claims that the Board improperly used NS's internal business forecasts for the CP&L and Duke traffic moving in 2002-2004 given language in the Decision indicating that the Board would use EIA data to forecast coal volumes for those time periods. While it is clear that the Board did use NS business forecasts to project the CP&L and Duke traffic, CP&L does not agree that this was an error on the Board's part.¹

In its Reply Evidence in this case, NS submitted more detailed information in its "base case" traffic analysis regarding CP&L's and Duke's traffic levels than it submitted for any other P&SH shipper.² Specifically, NS referenced discussions with CP&L and Duke personnel that allowed NS to make certain refinements to the NS internal business forecasts regarding CP&L and Duke for 4Q02 through 2004. Id.

¹ The net effect of the Board's use of NS's internal business forecasts for CP&L and Duke's 2002-2004 traffic (rather than relying upon the EIA forecasts for CP&L and Duke's traffic for those three years) is to: (i) decrease the P&SH's 2002 traffic volume by 1,492,739 tons; (ii) to increase the P&SH's 2003 traffic volume by 1,830,443 tons; and (iii) to increase the P&SH's 2004 traffic volume by 2,243,018 tons. However, the Board's tonnages are, for each year, below CP&L's figures, significantly so in 2003. See Decision, Table B-1.

² See NS Reply electronic workpaper "Piedmont RR Coal Traffic Forecast revised.xls." The Duke data is located on the index level and the CP&L data is located on the Summary level of this workpaper.

The Board's action in applying the NS internal forecast to the CP&L and Duke traffic, but rejecting its application as to other shippers, is entirely reasonable. The Board's rejection of the NS internal forecast was based on its concerns about the manner in which NS applied the forecast to limit the traffic group to only those movements that moved within the same O/D pairs. This concern, however, was not material with regard to the CP&L and Duke traffic. As reflected in NS's Reply workpapers, all of the O/D pairs for CP&L's and Duke's traffic included in CP&L's traffic group were also included in the NS internal forecast for each of the years 2002, 2003 and 2004.³ The evidence also demonstrates that the tonnages forecast by NS for 2002-2004 for both Duke volumes and CP&L volumes were very close to the tonnages forecast by CP&L.⁴ Accordingly, there does not appear to be any material impact of the nature that led the Board to avoid use of the NS internal forecasts on the balance of the traffic group.

While NS characterizes the Board's treatment of the CP&L and Duke volumes as "technical error," it is evident from a review of the Board's electronic spreadsheets that the Board fully understood that it was treating the CP&L and Duke traffic in a manner that differed from its treatment of the other P&SH traffic. In

³ See NS Reply electronic workpaper "Piedmont RR Coal Traffic Forecastrevised.xls" at worksheet "Coal Forecast By Calendar Year," at column K.

⁴ Aggregate tonnages for the period 2002-2004 forecast by NS were: CP&L - 22,780,657, Duke - 27,633,399. The CP&L forecasts were CP&L - 23,283,891, Duke, 28,233,174. The geometric average annual difference is approximately 0.7%. For the other coal traffic in the traffic group, the difference was almost twice as large at 1.3%. See CP&L electronic workpaper "Aggregate Forecasted Duke-CPL Tons.xls" submitted with this Reply.

particular, Table L: “Piedmont RR - Stand-Alone Costs and Revenues,” which is included within the Board’s electronic workpapers, includes the following heading:

STB Exp. and Inv. and EIA 2003 Projections for Tons and
Rev 2002-21 (Contract/Water), and **NS Projections Duke**
and CPL - As of 12-19.03 WITH 16 REROUTES

See STB electronic workpaper “Final DCF.123,” sheet “Netting” (emphasis added). This explicit heading contradicts NS’s suggestion that the use of the NS traffic forecasts for CP&L and Duke’s traffic constituted some sort of technical error or oversight. Instead, it is apparent that while the Decision did not offer a detailed explanation of the treatment of the CP&L and Duke traffic volumes for this period, the Board intended to treat those volumes differently. As noted above, the Board had good cause to do so.

Second, the Board did not commit “technical error” by utilizing EIA’s AEO 2003 traffic forecast (which was published in January of 2003). NS suggests that the Board should not have relied on the EIA forecast data, but instead should have used traffic figures for 2002 that were published by EIA at some later time. See NS Petition at 1-2 (claiming that “The EIA’s final year-end actual data . . . were published before the Board issued its Decision.”). In its Petition, NS fails to state precisely when this data became available. Regardless of when it became available, however, the Board’s decision to rely on EIA’s AEO 2003 traffic forecast data was entirely proper.

The Board clearly is under no obligation to continuously reach outside the record to update data that it may rely upon in performing its calculations. Indeed, the law of this case confirms the Board’s recognition that “there must be a clearly defined cut-off point, after which the record of the proceeding is closed.” See Docket No. 42072 (STB

served May 12, 2003) at 1 (striking NS's attempt to submit revised 2002 traffic data in conjunction with its February 28, 2003 Brief); accord Finance Docket No. 34013, B. Willis, C.P.A., Inc. – Petition for Declaratory Order (STB served July 26, 2002), at 3 (“The limitations in our rules against the introduction of new evidence reflect the need for finality in the administrative process.”).

NS's attempt to introduce data that was not available until after all the evidentiary filings and briefs in this case were submitted runs directly counter to the Board's May 12, 2003 finding that there must be a “defined cut-off point” for the evidence. To hold otherwise would enmesh the Board in an endless series of filings to revisit traffic assumptions as real-world events vary one way or another from the Board's assumptions.

NS's claim that the Board erred by not continuously checking for updates to data relied upon in making its calculations also is directly contradicted by a number of decisions of the United States Supreme Court. See, e.g., Bowman Transp., Inc. v. Arkansas-Best Freight System, Inc., 419 U.S. 281, 294 (1974); ICC v. Jersey City, 322 U.S. 503, 514 (1944); accord Illinois Comm. Comm'n v. United States, 292 U.S. 474, 480 (1934); see also Nance v. EPA, 645 F.2d 701, 717 (9th Cir. 1981). As such, the Board's reliance on the EIA AEO 2003 data does not constitute “technical error.”

In any event, the Decision in the instant case indicates that the Board had sound reasons for using the EIA AEO 2003 forecast. As the Board noted, there was a close correlation between the 5.5% decline reported by EIA for the Central Appalachian region and both the Quarterly Commodity Statistics (“QCS”) that NS itself had filed with

the Board (i.e., a 5.8% decline) and the Board's Waybill Sample for the NS system. See Decision at 17. NS simply has not demonstrated that the Board intended to adopt reflexively whatever data EIA published for 2002 volumes without regard to the other NS-specific traffic information at the Board's disposal. Instead, the language of the Decision itself reflects that the Board assessed the propriety of using the 2002 EIA data in light of these other considerations.

Finally, CP&L notes that NS has not only faulted the Board for relying on 2002 data contained in the EIA AEO 2003 Report, but has also encouraged the Board to adopt 2003 data contained in the EIA AEO 2004 Report. See, e.g., NS Petition at 9 n.10 (referencing the "just-released" EIA AEO 2004 Report). Recently, the Board noted that it would not apply the EIA 2004 forecast because it was "released too late to be relied upon." See Docket No. 42070, Duke Energy Corp. v. CSX Transportation, Inc. (STB served Feb. 4, 2004), at 47 ("Duke v. CSXT").⁵ Given that the Decision in this matter was issued roughly six weeks before the decision in Docket No. 42070, a similar conclusion that the EIA 2004 forecast NS seeks to impose was released too late to be relied upon in this matter is clearly in order. Accordingly, it cannot be considered a "technical error" for the Board to continue to apply the EIA AEO 2003 forecast, which was available on a time frame that allowed ample time for it to be considered and utilized in the Board's analysis and preparation of its Decision.

⁵ Similarly, in its decision last week in Docket No. 42069, the Board revised its traffic findings to be consistent with the Decision in the instant case. In so doing, the Board applied the EIA AEO 2003 forecast, even though it was fully aware of the existence of the EIA AEO 2004 forecast. See Docket No. 42069, Duke Energy Corp. v. Norfolk Southern Ry. (STB served Feb. 3, 2004) at 4-5 ("Duke v. NS Corrected").

In summary, the Board should not allow itself to be placed in a situation in which its decisions are subject to quarterly reopening or reconsideration to test the validity of each of the Board's findings regarding traffic volumes, the cost of labor, the cost of fuel, etc., etc. NS's Petition invites the Board to embark on this very type of endless re-evaluation of its own decisions and thus to obliterate any notion of finality in rate reasonableness litigation.

Finally, the Board's Decision includes, as it must, many assumptions. It would be improper and unfair to update only tonnage assumptions as NS requests here. As CP&L's counsel stated at the oral argument:

[NS] introduced some information about tonnage decreases in 2003 they would like you to take judicial notice of. I would submit that the record is closed. There are a lot of things we would like to ask you to take judicial notice of too if we're going to get into that. You can't allow cherry picking of that nature on the record. It is what it is.

See November 19, 2003 Oral Argument Transcript ("Tr.") at 105.

B. Tunnel Costs

NS contends that the Decision found that ten tunnels on the P&SH would require double-tracking and that the cost of a double-tracked tunnel would be 175% of the cost of a single-track tunnel, but that the Board did not make this adjustment. See NS Petition at 2. CP&L concurs that this appears to be an inadvertent error, but CP&L disputes the "correct" amount set forth in NS's Petition. Specifically, NS's Petition ignores a related technical error in the Decision regarding the number of linear feet ("LF") of tunnels.

In the Decision, the Board incorrectly states that CP&L and NS agreed that the P&SH would include 52,949 LF of tunnels. Id. at 93. NS's Reply included 52,934 LF on tunnels, while CP&L included 52,311 LF of tunnels in its Rebuttal. The correct number of tunnel feet should be 51,950.⁶ The Board relied upon NS's calculation of tunnel feet, thereby overstating the length of tunnels by 984 LF.

The impact of the error in LF has implications for mobilization, engineering, and contingencies, as well. In the aggregate, the total impact of correcting the Board's tunnel daylighting error should be to increase construction costs by \$55,917,397 rather than the \$62.5 million figure set forth in NS's Petition.⁷

C. Locomotives for MOW Trains

NS claims that its evidence required three locomotives to power MOW trains, and that the Board accepted NS's operating plan generally (and therefore should have accepted the MOW locomotives as well). See NS Petition at 2-3. NS's Petition, however, fails to identify a specific intent on the Board's part to include these trains in its cost calculation, instead suggesting only that its evidence had demonstrated that such locomotives were necessary. CP&L disputes NS's characterization of this item as technical error, and does not agree that the Board inadvertently failed to include the locomotives in the P&SH's costs.

⁶ NS overstated the tunnel feet by 984 LF due to its inclusion of both the Hatfield WB and EB tunnels in an area of single track. CP&L overstated the tunnel feet by 381 LF due to the inclusion of the Huger EB tunnel next to the daylighted Huger WB tunnel. Correcting these items for each party results in "agreement" on 51,950 LF for tunnels.

⁷ CP&L's \$55.9 million figure includes: \$43.09 million (base investment), \$4.17 million (mobilization), \$4.35 million (engineering), and \$4.31 million (contingencies).

D. P&SH Operating Expenses

NS claims that the Board understated the P&SH operating expenses by \$13.7 million per year due to two technical errors. First, NS claims that the Board's revised tonnage figures had the effect of changing the peak traffic year from what had appeared in NS's evidence (i.e., from 2003 to 2008). Second, NS claims the Board erred in the ratio it used for base year tons to peak year tons. See NS Petition at 3-4. NS claims that, as a result of these two errors, the Board understated operating costs by \$13.7 million per year. See NS Petition electronic workpaper "stb-Operating Expense NS-12-22-03 (Modified) 2008 Analysis.xls," sheet "SARR Base Exp." CP&L agrees that the Board has erred with respect to the ratio issue, but not the peak year issue. In fact, as a result of an additional technical error in the Decision that NS did not identify, the P&SH's tons for 2008-2022 are not correct.

In particular, the Board's application of the EIA forecast is incorrect because of the presence of certain hardcoded tonnage figures in the Board's spreadsheet for 2008.⁸ These hardcoded figures cause tons for the P&SH to be overstated by approximately 100,000 tons per year beginning in 2008 and continuing through 2022. As a result, NS's "corrected" operating expense figure of \$13.7 million per year is itself incorrect because NS relies on overstated 2008 tonnage figures to arrive at its operating expenses.

⁸ See STB electronic workpaper "Final Revenues and Tons.xls," sheet "Contract and Water," cells BX9 through BX21, BX23 through BX29, BX40 through BX47, and BX56 through BX118.

NS is correct in its claim that the Board erred in calculating the peak year to base year ratio in order to adjust the P&SH peak year operating statistics to reflect base year operations. Specifically, the Board correctly developed the peak year 2003 statistics based on its restated tonnages, but in adjusting the statistics to reflect base year 2002 operations, the Board used a ratio based on NS's 2002 and 2003 Reply tonnages. This understated the ratio and understated the base year operating statistics. The correct ratio should be developed based on the relationship of the Board's 2003 and 2002 restated tonnages.⁹ When the Board corrects the 2008-2022 tonnage figures and the peak year to base year ratio calculation, the impact on the annual operating costs should flow through the calculations.

E. Operating Managers/G&A

CP&L concurs with NS's statement that a discrepancy exists between the Board's Decision and its workpapers regarding the number of operating managers and general administrative personnel. See NS Petition at 4. NS is correct that correcting this error reduces P&SH operating expenses by approximately \$1.27 million annually. Id.

F. Startup Costs

CP&L concurs with NS's Petition regarding the existence of a technical error in the calculation of startup costs. See NS Petition at 4. However, CP&L disputes the revised cost total set forth by NS.

⁹ NS's argument that the statistics need to be based on the "revised" peak year of 2008 has no merit. As long as the ratio between 2003 and 2002 is calculated properly, the costs for the ensuing years that are impacted by volumes are correctly increased (or decreased) based on the relationship of the tonnage volumes each year. To the extent that 2008 volume is higher, the operating costs will be correspondingly higher.

NS contends that first-year operating costs should be increased by \$8.8 million to reflect first-year startup costs (primarily training costs). CP&L has determined, however, that the Board erred in calculating training and recruitment by basing executive recruitment costs on NS's excessive G&A staffing levels even though the Board agreed nearly entirely with CP&L with respect to P&SH staffing levels. See Decision at 61. The Board's calculations also improperly included recruiting expenses for P&SH staff members who already would have been trained, thus contradicting the Board's own finding in the Decision. Id. at 67 ("Where training costs are included, it is unnecessary to include recruiting costs as well."). Correcting these additional errors, CP&L has determined that the appropriate first-year cost increase should be \$7,850,622, rather than the \$8,776,180 advocated by NS.¹⁰

G. New Yard Earthwork Costs

Finally, NS explains that the Board improperly overstated the P&SH's new yard earthwork costs. See NS Petition at 5. While CP&L agrees that the Board has erred in this respect, CP&L also notes that the Board overstated the earthwork costs associated with all of the P&SH's yards. Furthermore, NS's proposed correction is inaccurate. Specifically, NS attempts to resolve the Board's error by using the same NS spreadsheet that led to the Board's initial problem. This spreadsheet uses the improper NS methodology of calculating earthwork quantities that the Board rejected in the Decision.

¹⁰ An explanation of these errors and the manner in which they should be corrected is included in the electronic workpaper "Corrections to STB Training and Recruitment.doc," filed with this Reply.

Id. at 79. In addition, NS's proposed solution also fails to exclude NS's costs associated with yard drainage that the Board rejected in the Decision. Id. at 83.

The proper approach to correcting the Board's yard earthwork cost error is to insert the Board's revised yard track feet¹¹ into CP&L's Rebuttal grading spreadsheet "III-F_Grading Piedmont RR Rebuttal.123," sheet "IIIF_9 Yards," Column (C) and to add a line for the new Iaeger Yard created by the return of some re-routed traffic to its original routing.¹² This correction results in yard grading costs of \$3,065,490 indicating that the Board overstated new yard grading costs by \$68,254,595.

Including the impact of these corrections on mobilization, engineering, and contingencies, the proper overall cost reduction regarding new yard earthwork costs should be \$82,431,075, rather than the \$73.1 million figure calculated by NS.¹³

II. PETITION FOR RECONSIDERATION¹⁴

In addition to its allegations of technical error, NS's January 20th filing also seeks reconsideration of a number of different elements of the Board's Decision. See NS Petition at 1. Under 49 C.F.R. § 1115.3(b), reconsideration is appropriate where: (1) the

¹¹ See STB electronic workpaper "DCF Construction Total.xls," sheet "Yards," column (J).

¹² This has been done in the revised grading spreadsheet "III-F_Grading Piedmont RR Rebuttal STB.123" included with this Reply. See sheets "IIIF_9 Yards" and "IIIF_15 EW Costs." Applicable calculations are highlighted in yellow.

¹³ CP&L's \$82.43 million figure includes: \$68.25 million (base investment), \$0.46 million (mobilization), \$6.89 million (engineering), and \$6.83 million (contingencies).

¹⁴ CP&L's Reply to NS's arguments in favor of reconsideration, which begins at this point, complies with the page limitations set forth in 49 C.F.R. § 1115.3(d).

prior action will be affected materially because of new evidence or changed circumstances; and/or (2) the prior action involves material error. See Docket No. 42006, Omaha Pub. Pwr. Dist. v. Union Pacific R.R. (STB served Nov. 15, 2000), at 2. A petition for reconsideration must state in detail the nature and reasons for the relief requested and any new evidence introduced must be stated briefly, and not appear to be cumulative, and an explanation must be given as to why that evidence was not previously adduced. See F.D. No. 32645, Big Stone-Grant Indus. Devel. and Transp., LLC – Constr. Exemption – Ortonville, MN and Big Stone City, SD (STB served Sept. 23, 1999); F.D. No. 34040, Riverview Trenton R.R. – Pet. for Exemp. from 49 U.S.C. 10901 to Acquire and Operate a Rail Line in Wayne County, MI (STB served Aug. 27, 2003), at 2.

A. Preface and Summary of Argument

NS's Petition for Reconsideration is largely cumulative of arguments that the Board considered and rejected in its Decision. For example, NS once again claims that the Board should have adopted NS's approach to determining P&SH base year traffic levels, but offers no compelling new justification for that demand. Instead, NS seeks to gain support for its flawed traffic evidence (see NS Petition at 6-7) by recasting its unsuccessful effort to limit the P&SH's traffic group to specific O/D pairs. As CP&L explains infra, NS's argument does not constitute a legitimate justification for a reversal of the Board's ruling.

NS also argues in its Petition that the Board was obligated to update the traffic data on which it based its Decision, and that, even now, the Board remains obligated to continue to update the calculations underlying its Decision on the basis of

EIA forecasting data that has been made public since the date of the Decision. See NS Petition at 1-2, 5, 8-10. As CP&L demonstrated in its Reply to the Petition to Correct Technical Error, supra, however, the standard that NS advocates is inconsistent with Board and Supreme Court precedent and would lead the Board into an unending cycle of periodic updates to its rate case decisions.

NS's Petition also re-urges adoption of NS's overpriced and inappropriate backhoe excavator, claiming that it is appropriate for the relevant territory and that the equipment CP&L selected is something other than what CP&L has represented to the Board. See NS Petition at 12-13. The Board has correctly rejected this argument not only in the Decision, but also in Docket No. 42069, Duke Energy Corp. v. Norfolk Southern Ry. (STB served Nov. 6, 2003), at 94 ("Duke v. NS") and in Duke v. CSXT (at 79). NS advances no basis for revisiting this issue.

B. The Board Correctly Rejected NS's Attempt to Unduly Restrict Traffic and Revenues Available to the P&SH

NS seeks reconsideration of two issues underlying the Board's traffic and revenue findings. See NS Petition at 5-10. First, NS suggests that the Board erred by not restricting the P&SH traffic group in a manner that the Board correctly concluded was inconsistent with the constantly shifting traffic patterns in the Central Appalachian ("CAPP") coal region served by the P&SH. Second, NS claims the Board should substitute more recent EIA forecasts to estimate the P&SH traffic levels for 2003 and for 2004-2021. Specifically, NS argues that the Board should have relied on actual EIA production data for 2002 and 2003, and forecast data for 2004-2021 that was published

after the data relied upon by the Board in its Decision. As demonstrated below, the Board's approach does not constitute error in either regard.

1. The Board's 2002 Traffic Findings Are Not Erroneous

As recognized in Coal Rate Guidelines:

The ability to group traffic of different shippers is essential to [the] theory of contestability. It allows the captive shipper to identify areas where production economies define an efficient subsystem or alternative system whose traffic is divertible to a hypothetical competitor.

Coal Rate Guidelines, Nationwide, 1 I.C.C.2d 520, 544 (1985). The Board has further noted that a shipper presenting a stand-alone cost analysis "can select any subset of available traffic to determine the least cost at which that subset of traffic could be served independently of other traffic." See Docket No. 41191, West Texas Utilities Co. v. Burlington Northern R.R. (STB served May 3, 1996) at 16. Consistent with these principles, CP&L did not, as NS correctly notes, select every shipper that moved traffic in 2001 over the NS lines replicated by P&SH. Instead, CP&L chose a traffic group consisting of a subset of actual 2001 traffic movements. In its Decision, the Board relied on CP&L's tonnages for 2001, and projected volumes for 2002 by applying the rate of change reported by the EIA for CAPP region tonnage from 2001 to 2002, to CP&L's 2001 base tonnage. See Decision at 18.¹⁵

NS takes issue with this finding and claims that the Board's rejection of NS's 2002 tonnage was based on a finding that "NS did not include all of the coal that

¹⁵ As noted, supra, the only exceptions to this approach were the Board's use of internal NS forecasts to estimate tonnage levels for CP&L and Duke traffic.

could have moved over the lines replicated by the P&SH.” See NS Petition at 6 (emphasis in original). However, this was not the basis for the Board’s rejection of NS’s flawed forecasting approach. Rather, the Board rejected the NS approach based on its recognition of the dynamics of the CAPP marketplace. As the Board explained: “An O/D pair-specific approach to the traffic group is too restrictive in this situation” (see Decision at 17):

The better approach is to view the traffic group selected by CP&L here as meant to encompass all coal traffic served by NS that moves over the lines replicated by the P&SH (as well as the grain traffic identified) and to view the particular coal traffic that moved over those lines in 2001 as representative of the aggregate traffic that would be expected to move on the P&SH in future years. Thus the fact that some traffic would not continue to move from a specific mine to a specific destination throughout the SAC analysis period does not mean that other traffic would not move from the mines served by the P&SH.

Id.

NS’s request for reconsideration of this consequential issue is simply a rehash of NS’s failed attempt to get the Board to ignore the phenomenon of origin shifting in the CAPP region. NS offers no new evidence or reasoning to support reconsideration. Instead, it focuses on a fact that was never in dispute, i.e., that CP&L’s group did not include all of the coal that could have moved, and mischaracterizes the Board’s bases for rejecting NS’s attempt to ignore the marketplace reality that CAPP traffic patterns are constantly shifting.

NS’s additional convoluted attempt to bootstrap acceptance of its under-inclusion of traffic in the 2002 traffic base by arguing that its internal forecast of CAPP

coal volumes was “overly optimistic” is equally lacking in merit. See NS Petition at 7. Towards this end, NS notes that it applied an internal forecast that showed increasing traffic volumes in the fourth quarter of 2002 to its reduced tonnage volumes for the first three quarters. Id. NS further notes that, by contrast, the EIA data showed a decline in the fourth quarter and that, accordingly, the overstated fourth quarter forecast “offsets” any understatement that results from NS’s exclusion of traffic resulting from origin shifting. Id.

The EIA data that NS cites adds nothing to NS’s argument. The forecast applied by the Board uses the 2002 forecast data for the entire year, not the fourth quarter alone, and applies the percent of change in that data to the 2001 traffic volumes. Thus, NS mixes apples and oranges in trying to justify its specific O/D pair approach through reference to actual fourth quarter data. NS’s claims do not warrant reconsideration of the Board’s conclusions relating to the appropriate 2002 traffic volumes to be used in the SAC Analysis.

2. The Board’s Use of the EIA AEO 2003 Forecast to Project Volumes for 2003 and 2004-21 is Entirely Appropriate

Furthermore, the Board’s reliance on the EIA AEO 2003 forecast clearly does not constitute error. NS Petition at 8-10. In support of its claimed error, NS states that “it is indefensible and contrary to Board precedent to rely upon forecasts when actual production data for the same period are available (and demonstrate that the forecasts are inaccurate).” Id. at 9 (referring to 2003 data) (emphasis in original). On the contrary, as noted above, there is ample precedent recognizing that in complex and lengthy agency proceedings it is fundamentally necessary and appropriate for an agency to cut off the

record at some point in order to avoid a never-ending need to reconsider or reopen and update its decisions. See Bowman Transp., Inc., 419 U.S. at 294, 296; ICC v. Jersey City, 322 U.S. at 514; Illinois Comm. Comm'n, 292 U.S. at 480 (holding that the ICC did not abuse its discretion in refusing a request for a new study as a basis for rate-making despite, *inter alia*, an alleged “falling off in volume of traffic”); Nance, 645 F.2d at 717.

Even if the Board were to agree with NS that it erred in not using EIA final 2002 actual production data and January through December 2003 actual production data that only recently became available,¹⁶ NS has incorrectly applied that data. Specifically, NS calculated volumes as follows:

¹⁶ While claiming the Board should use the EIA AEO 2004 forecast, NS actually used EIA’s AEO 2003 forecast to project tonnages for 2004 through 2021.

TABLE 1
Application of EIA Forecast of
Central Appalachian Coal Production

<u>Item</u> (1)	<u>2001</u> (2)	<u>2002</u> (3)	<u>2003</u> (4)	<u>2004</u> (5)	<u>2005</u> (6)	<u>2006</u> (7)
1. EIA AEO 2003 Forecast	266.95	252.35	252.96	251.93	252.61	258.26
2. Percent Change Line 1 as Used In CPL Decision	xxx	-5.5%	0.2%	-0.4%	0.3%	2.2%
3. EIA Production Data Released Since CPL Evidence and used in NS Petition	266.95	245.9	xxx	xxx	xxx	xxx
4. Percent Change Line 3	xxx	-7.9%	xxx	xxx	xxx	xxx
5. EIA Production Data for January - Dec. 20, 2002 and 2003 used in NS Petition	xxx	240.4	223.5	xxx	xxx	xxx
6. Percent Change Line 5	xxx	xxx	-7.0%	xxx	xxx	xxx
7. NS Procedures That They Claim are EIA Procedures	266.95	245.9 1/	228.6 2/	xxx	xxx	xxx
8. Percent Change Line 7 applied to 2001-03 Percent Change Line 2 for 2004 and beyond applied to Line 7 NS 2003 tons	xxx	-7.9%	-7.0%	-0.4% 3/	0.3% 3/	2.2% 3/
9. Correct EIA Procedure using Line 3 and Line 5 for 2002 and 2003 and Line 1 for 2004-6	266.95	245.9 1/	228.6 2/	251.93 4/	252.61 4/	258.26 4/
10. % Change from Correct EIA Procedure (Line 9) to be applied to P&SH tonnages	xxx	-7.9%	-7.0%	10.2%	0.3%	2.2%

1/ From Line 3.
2/ Column (3) x (1.0 + Line 6, Column (4)).
3/ NS does not recalculate the productions to reflect the revised data for 2002 and 2003 changes.
4/ Change from prior year and result shown on line 10.

As the foregoing Table demonstrates, NS has taken actual production data for 2002 and 2003 that was not available at the time EIA's AEO 2003 forecast was prepared and calculated the percent change from the 2001 base year. NS then, however,

ignores the AEO 2003 forecasts of Central Appalachian coal volumes for 2004 and subsequent years, and adjusts volume levels by applying the percent changes found in that forecast to its reduced tonnage levels for 2002 and 2003. NS does not provide any justification for this procedure, and there is none.

The Board has recently rejected similar efforts to modify forecasts with information that was not available at the time the forecast was originally prepared. In Duke v. CSXT (id. at 45-46), the Board noted that it was improper to apply forecasts prepared with one base year, to data from a different base year. Id. at 45.

A similar conclusion is warranted with respect to the manner in which the parties differ in their application of the AEO 2003 forecast. NS's approach is similar to CSXT's approach in Docket No. 42070. NS relies upon 2002 and 2003 actual production data that was below the original forecast for these periods. NS then applies the percent change for each year subsequent to 2003 derived from the 2004 to 2021 tonnage figures in the AEO 2003 forecast. In doing so, however, NS applies the percent change to the reduced tonnage levels for 2003, rather than reverting to the tonnage levels used by EIA for the 2004-2021 period in its 2003 forecast.

3. The Board Should Not Apply EIA's AEO 2004 Forecast

NS's suggestion that the Board should apply the AEO 2004 forecast is without merit. As noted above, there is ample precedent confirming that the Board need not continually update the record as new forecasts become available after the close of the

record. Most recently, in Duke v. CSXT (*id.* at 47), the Board found that the AEO 2004 forecast was “released too late” to be relied upon in that decision.¹⁷ It was not error for the Board to apply the AEO 2003 forecast, which was available with ample time to be considered and utilized in preparing its Decision.

C. Retrofitting NS Locomotives for Operations on the P&SH Lines

NS contends that the Board should have included \$26.1 million in costs for retrofitting NS’s locomotives to operate in a DP configuration while on the P&SH’s lines. See NS Petition at 10-11.¹⁸ In support of this argument, NS creates a straw man argument that the Board supposedly premised its refusal to award the \$26.1 million cost on a finding that NS’s locomotives “would never run-through on the P&SH’s lines.” *Id.* at 10. The Decision, however, neither states nor relies upon a finding that NS locomotives would never run-through on the P&SH’s lines.

Instead, the Board’s Decision reflects the acceptance of CP&L’s explanation that trains consisting entirely of NS locomotives would operate in a “non-DP” configuration while on the P&SH’s lines. See CP&L Reb. at III-C-18 (“[I]f the Piedmont RR receives a train from NS at West Roanoke or Vabrook that has DC power

¹⁷ Likewise, in Duke v. NS Corrected, the Board corrected its earlier traffic analysis to be consistent with the Board’s traffic findings here. In so doing, the Board applied EIA AEO 2003 even though EIA AEO 2004 was available. *Id.* at 4-5.

¹⁸ NS argued in its evidence that the P&SH should be required to retrofit 307 NS locomotives (*i.e.*, 307 out of the 504 NS locomotives that operated 200 miles or more in CP&L service during 2001). See NS Reply at III-D-4. The Board found that the P&SH itself would require a total of 133 road locomotives. See Decision at 56.

on it, the Piedmont RR will usually keep the same power on the train and operate it to a mine where a DP configuration is not required and return [it] to West Roanoke (or another interchange point) for delivery to NS.”) (footnote omitted; emphasis added); see also CP&L Reb. at III-C-53 n.55 (“As noted earlier, some trains will be delivered with locomotives that are all NS-supplied, DC locomotives (e.g., the overhead grain trains). The locomotives on these trains will not operate in a DP mode.”) (emphasis added).

Based upon this flexibility, the Board found that NS’s proposed \$26.1 million retrofitting expense would be unnecessary:

. . . [A]s CP&L points out, NS’s proposed operating plan for the P&SH assumed that residual NS locomotives would not operate in DP service and it allowed time for exchanging P&SH and residual NS locomotives. Because NS’s operating plan for the P&SH is used here, there would be no need to equip residual NS locomotives to operate in DP service. Therefore, this [\$26.1 million] expense is excluded.

Id. at 57-58 (emphasis added). As such, the Board’s decision that NS’s \$26.1 million retrofitting cost should not be imposed upon the P&SH does not constitute material error and should not be altered.

**D. CP&L’s Earthmoving Equipment Selections
Were Properly Accepted by the Board**

NS’s Petition suggests that CP&L did not meet its burden of proof to demonstrate that its 3 Cubic Yard (“CY”) shovel for common earth grading was feasible and realistic or that the hydraulic backhoe excavator selected by NS was not feasible and realistic. See NS Petition at 12. As to both points, the Board has already determined that

CP&L did in fact meet its burden of proof. See Decision at 81. NS's Petition does not merit reconsideration on that basis. However, NS's Petition does present a number of new arguments on this point, which CP&L will address in turn.

As a preliminary matter, CP&L notes that NS's calculation of \$238 million in additional earthwork costs includes \$181.3 million (including additives) in solid rock excavation. In calculating this figure, NS substituted its Reply cost of \$11.65 per CY (to excavate and load boulders <0.5 CY using a front end loader) for the cost accepted by the Board of \$1.40 per CY (to excavate and load blasted rock using a 3 CY power shovel). See NS Petition electronic workpaper directory "Shovel Solid Rock," file "Copy of III F 2 Grading.xls," sheet "IIIF Unit Cost," cell "E42."¹⁹ NS's inclusion of these costs is improper because (a) the Board accepted CP&L's solid rock costs, which included moving blasted rock not boulders (see Decision at 82) and (b) NS has raised no new arguments justifying its boulder-loading approach. In fact, NS says nothing about the issue at all. Rather, NS appears to have reinstated its unit cost solely on the basis of its erroneous contention that CP&L's power shovel is not in fact a shovel.

1. 3 CY Shovel

Contrary to NS's statements, CP&L did not concede on Rebuttal that its Opening equipment selections were improper. NS Petition at 12. Rather, CP&L merely

¹⁹ The additives are derived by updating the other spreadsheets in the same directory.

demonstrated that different, larger equipment could do much of the same work for similar costs. See CP&L Reb. at III-F-36 to 38. Indeed, the Board properly recognized the similarities in cost and equipment by accepting CP&L's 3 CY power shovel as the appropriate equipment for common earthwork west of Roanoke. As demonstrated below, the Board's Decision on this issue is well supported.²⁰

NS states in its Petition, as it did at oral argument, that CP&L's power shovel is not a shovel at all, but rather a crane with a clamshell bucket attachment. See NS Petition at 14 and NS's Oral Argument Slide (attached hereto as Exhibit 1). NS's position is totally unfounded, and demonstrably incorrect.

In particular, NS claims that CP&L's unit cost from the Means Handbook (02315-400-3900, Shovel 3 CY capacity) does not actually provide for a shovel at all. See Exhibit 2. Ignoring the specific designation of the equipment in Means, NS suggests (at 14-15) that the Board look at the crew costs (crew B-12T) associated with the shovel line item, which references a 75-ton crawler crane and front-end attachment as the two pieces of equipment that theoretically make up part of the cost for a 3 CY shovel. See Exhibit 3. Based on the crew cost description, NS then groundlessly asserts that the 3 CY shovel is really a huge lattice boom crane with a clamshell bucket (i.e., a dragline) that in no way resembles a shovel. NS Petition at 15.

²⁰ The Board has again approved the use of the 3 CY Shovel in Duke v. CSXT (id. at 79). Notably, CSXT raised the same arguments at oral argument and in subsequent letters that NS raises here, which were rejected by the Board.

NS has misconstrued the cost computations in the Means handbook. The equipment type listed, 02315-400-3900, Shovel 3 CY capacity, is the controlling factor in determining what equipment is intended. In other words, when CP&L selected a power shovel, it meant a shovel. Means often uses one equipment rental reference cost (e.g., 75-ton crawler) to apply to multiple equipment designations (e.g., shovel, dragline).

To demonstrate this point, CP&L notes that there are several other smaller shovels listed under the same heading as the 3CY shovel.

02315-400-3700	½ CY Shovel
02315-400-3800	1 CY Shovel
02315-400-3850	1 ½ CY Shovel

See Exhibit 4. A review of the Means crew cost details indicates that they look much like the costs for CP&L's 3 CY Shovel, except that the other shovel entries list a power shovel and front end attachment instead of a crawler crane and front end attachment. See Exhibit 5. For example, the crew cost particulars for the 1 ½ CY shovel are as follows:

Crew B-120	1 Equip. Oper. (crane) ^[21]	\$32.35
	1 Equip. Oper. Oiler	26.65
	1 Power Shovel, 1.5 CY	809.20
	1 F.E. Attachment, 1.5 CY	110.00

Based on NS's approach, a 1.5 CY power shovel should be listed in the straight equipment rental section (section 1590) of Means – this is the section that NS references for the “lattice boom” designation – but there are no listings for power shovels in that

²¹ The designation of the equipment operator as “crane” is the same designation and cost assigned to the backhoe selected by NS (crew B-12D). See Exhibit 6.

section. See Exhibit 7 (a complete listing of section 1590). Instead, Means refers readers looking for shovel rental costs to the cranes section of the equipment rental listing. See section 01590-200-3850 referring to cranes (01590-600) (attached hereto as Exhibit 8).

When the cranes section is examined, all of the power shovel rental costs listed in the crew costs described supra are found under this crane designation, including the crawler crane cost used for the 3 CY shovel selected by CP&L. For example, the \$809.20 figure for the 1.5 CY power shovel listed above is exactly the same as the cost for a 1 ½ CY crawler mounted, lattice boom crane (01590-600-900) – confirming that Means uses such cost equivalents. See Exhibit 9. In other words, by NS’s reckoning all of the shovels would actually be cranes – a result that is both absurd and contrary to Means’ clear description of the equipment, in the first instance, as shovels.

Moreover, there is no doubt about what Means considers to be a shovel. As the Board is aware, Means publishes a companion book to the Heavy Construction Cost Data Book, the Heavy Construction Handbook. In that book, it describes the various types of equipment, including shovels. As demonstrated by the pages attached hereto as Exhibit 10, a power shovel is defined by Means as exactly what CP&L intended to use, and not a lattice crane with a clamshell bucket as NS depicted.²²

²² The Heavy Construction Handbook explains that “Most shovels have the same engine, cab, and undercarriages as a similarly-rated crane or backhoe. Thus, the front arms and bucket can be removed, and a crane boom or backhoe front-mounted in its place.” See Exhibit 10 at 240-41.

NS also ignores the front end attachment included in the 3 CY shovel crew cost. See Exhibit 3. This attachment is a 3 CY bucket that attaches to both shovels and backhoes. See Exhibit 11. In other words, it can be used face-up or face-down. It cannot, however, be used as an attachment to a crane equipped with a cable, which is probably why NS's oral argument slide (Exhibit 1) shows a clamshell bucket.

Finally, NS never disputes that a 3 CY shovel is appropriate. Rather NS rests its arguments entirely on its flawed premise that the shovel designated by CP&L's engineering experts is not a shovel.

2. NS's Backhoe Excavator

NS also suggests that the Board should revisit its acceptance of CP&L's equipment selections because CP&L failed to meet its burden of proof by demonstrating that NS's proposed 3 CY hydraulic backhoe excavator was infeasible and unrealistic. See NS Petition at 13.

It is clear that NS's equipment is unrealistic.²³ As CP&L stated in its Rebuttal (id. at III-F-42), and as the Board recognized in its Decision, the primary use for a backhoe excavator is digging below grade. Therefore, it would be "relatively inefficient

²³ NS's Petition attempts to characterize "infeasible" as "impossible," rather than "impracticable," and it further suggests that CP&L's agreement that using a backhoe was possible was tantamount to agreeing it was feasible. While CP&L does not deny that is *possible* to use a backhoe excavator to do the work for the P&SH, it is not practical, realistic or economical for a project such as this.

for other types of excavation,” including the excavation required here. See Decision at 81; see also Duke v. CSXT at 79.

The Board’s view is overwhelmingly supported by third-party sources. For example, the Means Heavy Construction Handbook states that a backhoe “is used to cut trenches for pipe or other longitudinal structures, to dig foundations, or to do other digging that permits pulling the bucket close to the chassis.” See Exhibit 12. The Handbook even notes that a “backhoe can reach high enough to dump the bucket into many types of hauling machines (though not as efficiently as shovels/loaders)” – the very point the Board and CP&L have already made. Id. (emphasis added).

E. The Board Properly Rejected NS’s Additional Hauling Costs

NS’s Petition raises no new arguments to support its unnecessary additive for hauling costs. As explained in CP&L’s Rebuttal, NS’s evidence on this point was inadequate because (i) NS did not provide any documentation from the Means Handbook, or any other evidence, supporting the use of this additive; (ii) as part of the construction of the P&SH, CP&L’s excavating equipment will establish a fairly level roadbed that would be used as a haul road; and (iii) the Means Handbook lists three production factors that address hauling: (a) length of haul; (b) condition of haul road, and (c) accessibility of site, none of which were problematic in this case. See CP&L Reb. at III-F-42. In fact, CP&L showed that: (a) the hauls will be short, (b) the condition of the haul road will be

good as it will be mostly prepared roadbed, and (c) the accessibility to the site will be good as it will follow along from railheads. Id. at III-F-43.

NS's Petition does not even consider any of the Means criteria. As for CP&L's Rebuttal points, NS merely suggests that the trucks will sometimes move excavated materials to an area that might require a fill, or that initially the roadbed may not be level. See NS Petition at 17. This hardly justifies the additive because the trucks are following behind the earthmoving equipment that is establishing the basic grade of the roadbed, and when a fill is required, the trucks would typically back up to the bank and dump the material. There is, therefore, no need for the trucks to regularly traverse "steep hills and valleys" as NS suggests. Id. Moreover, NS could have made any of these points in its Reply testimony, but it failed to do so.

Finally, NS's suggestion that the Board might have thought NS intended to apply the additive across the entire P&SH rather than just west of Roanoke is irrelevant because there is no need to apply the additive at all. Id. In addition, NS's electronic workpapers did not include the additive east of Roanoke and the Decision notes the geographic limitation. See Decision at 81. NS's hauling additive should be rejected. See Duke v. CSXT at 79.

**F. The Board Properly Accepted CP&L's
Evidence on Clearing and Grubbing**

NS's Petition seeks an additional \$33.7 million for clearing and grubbing of trees greater than 12" in diameter. NS Petition at 18. NS's request is unfounded and contrary to the evidence presented, and does not meet the standards for reconsideration. Therefore, the Board should affirm its Decision on this issue. See Duke v. CSXT at 76.

As the Board is aware, CP&L is the only party to submit any actual evidence with respect to the size of the trees in the P&SH territory. That evidence demonstrated that more than 70 percent of the trees on the right-of-way are 12" or smaller in diameter. Consequently, CP&L used the costs for clearing and grubbing of 12" trees as a reasonable average because, while some trees were larger than 12", others were smaller. Notwithstanding that evidence, NS now asks the Board to cost 30 percent of the total clearing and grubbing quantities using the costs for 24" diameter trees because some trees were larger than 12". Id. NS's request is improper for at least two reasons.

First, NS completely ignores the fact that many trees were smaller than 12". Second, NS does not even mention the substantial evidence submitted by CP&L demonstrating that trees even 10" and greater are highly sought after by lumber companies – so much so, that several different lumber companies said they would clear the trees at no cost to the landowner. See CP&L Reb. at III-F-25.

CP&L submits that, in fact, it overpaid for clearing 30 percent of the railroad because it included the 12" diameter clearing and grubbing cost when it could

have had the larger trees cleared for free. CP&L's treatment was clearly conservative. In any event, NS has failed to present any reason for the Board to reconsider this issue.

G. No Additional Yard Earthwork is Required

NS's Petition suggests, just as NS did in its Reply, that the one-foot fill rule is reasonable to allocate grading quantities between the mainline and yards, but somehow fails if the yard is located where no yard currently exists on NS's system. NS Petition at 19. The Board correctly decided the yard quantity issue for the Kenova and Vabrook yards (see Decision at 79), and NS has not presented any arguments that justify reconsideration.

CP&L's Rebuttal demonstrated that NS's position is flawed. Indeed, NS has not even suggested that CP&L's Rebuttal evidence on this point is incorrect.

On Rebuttal, CP&L pointed out a number of problems with NS's approach, including the fact that NS itself constructed only 18% of the yard tracks that originally existed. See CP&L Reb. at III-F-28 to 33 and electronic workpaper file "Piedmont RR Yard Track Comparison Rebuttal.xls." Consequently, adding additional costs would represent a double count as the Board recognized in Docket No. 42051, Wisconsin Power & Light Co. v. Union Pacific R.R. (STB served Sept. 13, 2001), at 81. The Board should not change its ruling on this issue.

CONCLUSION

Except as otherwise specifically noted above, the Board should deny NS's requests for the correction of technical error, and should deny in their entirety NS's requests for reconsideration of the Decision.

Respectfully submitted,

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DATED: February 9, 2004

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CERTIFICATE OF SERVICE

I hereby certify that this 9th day of February, 2004, I have caused copies of the foregoing Consolidated Reply to Petition to Correct Technical Error and Petition for Reconsideration to be served by hand on counsel for defendant Norfolk Southern Railway Company as follows:

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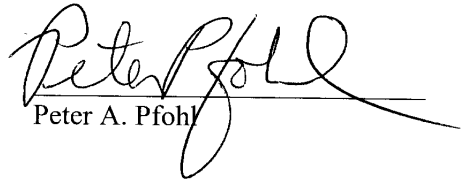

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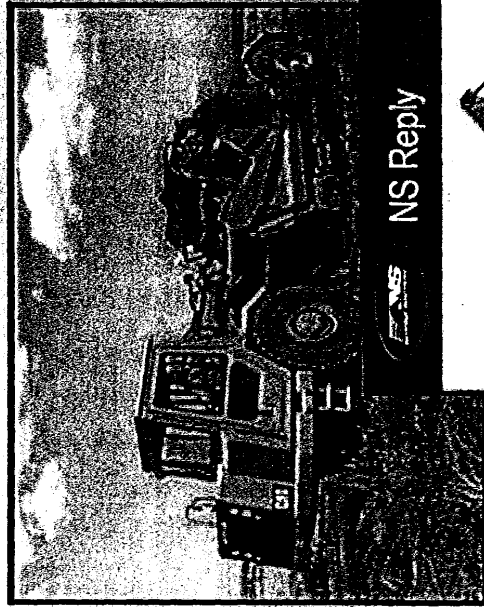
Exhibit 1

Alfred
You might
check out Dan on
reducing number
of exhibits further.
They are somewhat
duplicated.
R. J. [Signature]

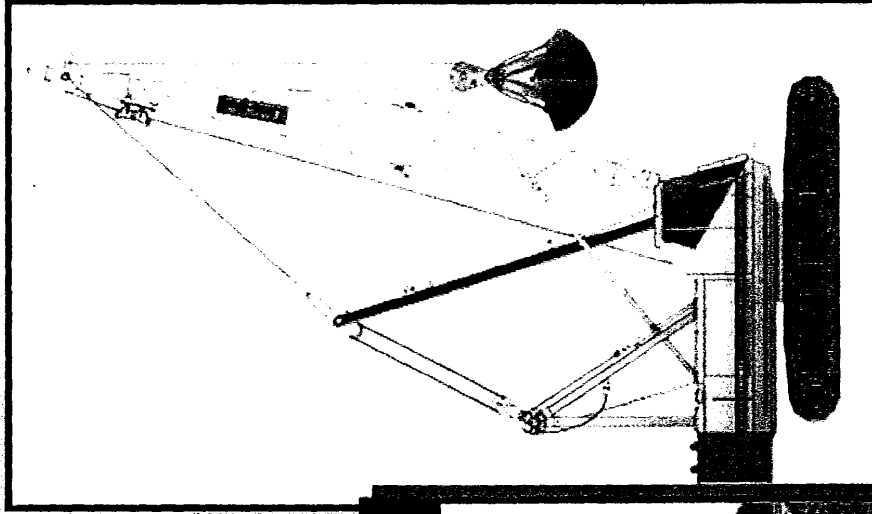
Cranes/Excavators



CP&L Opening



CPL & Rebuttal



NS Reply

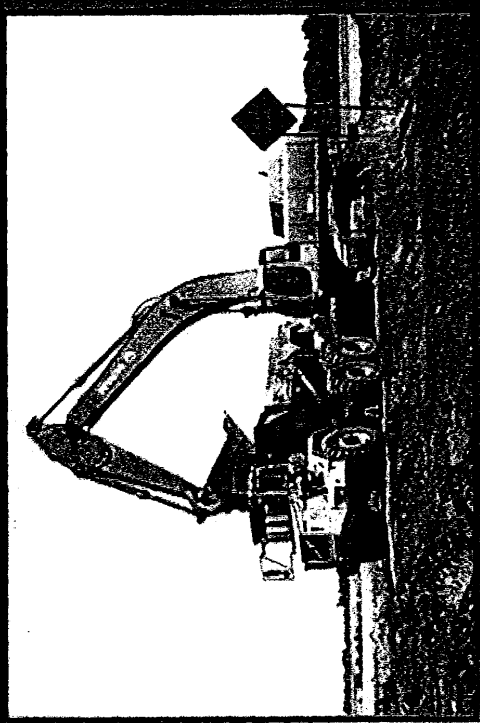


Exhibit 2

02300 | Earthwork

2 SITE CONSTRUCTION

02315 Excavation and Fill				CREW	DAILY OUTPUT	LABOR HOURS	UNIT	2002 BARE COSTS				TOTAL INCL O&P	
								MAT.	LABOR	EQUIP.	TOTAL		
400	1050	1-1/2 C.Y. cap. = 65 C.Y./hr.	R02315-400	B-12P	520	.031	C.Y.		.91	1.61	2.52	3.14	400
1100	3 C.Y. cap. = 112 C.Y./hr.			B-12V	900	.018			.52	1.30	1.82	2.22	
1200	Front end loader, track mtd., 1-1/2 C.Y. cap. = 70 C.Y./hr.		R02315-450	B-10N	560	.021			.61	.47	1.08	1.45	
1250	2-1/2 C.Y. cap. = 95 C.Y./hr.			B-100	760	.016			.45	.66	1.11	1.41	
1300	3 C.Y. cap. = 130 C.Y./hr.			B-10P	1,040	.012			.33	.66	.99	1.23	
1350	5 C.Y. cap. = 160 C.Y./hr.			B-10Q	1,280	.009			.27	.76	1.03	1.25	
1500	Wheel mounted, 3/4 C.Y. cap. = 45 C.Y./hr.			B-10R	360	.033			.95	.60	1.55	2.10	
1550	1-1/2 C.Y. cap. = 80 C.Y./hr.			B-10S	640	.019			.54	.43	.97	1.30	
1600	2-1/4 C.Y. cap. = 100 C.Y./hr.			B-10T	800	.015			.43	.46	.89	1.16	
1601	3 C.Y. cap. = 140 C.Y./hr.				1,120	.011			.31	.33	.64	.83	
1650	5 C.Y. cap. = 185 C.Y./hr.			B-10U	1,480	.008			.23	.53	.76	.93	
1800	Hydraulic excavator, truck mtd., 1/2 C.Y. = 30 C.Y./hr.			B-12J	240	.067			1.97	3.07	5.04	6.35	
1850	48 inch bucket, 1 C.Y. = 45 C.Y./hr.			B-12K	360	.044			1.31	2.41	3.72	4.63	
3700	Shovel, 1/2 C.Y. capacity = 55 C.Y./hr.			B-12L	440	.036			1.07	.80	1.87	2.50	
3750	3/4 C.Y. capacity = 85 C.Y./hr.			B-12M	680	.024			.69	.80	1.49	1.93	
3800	1 C.Y. capacity = 120 C.Y./hr.			B-12N	960	.017			.49	.72	1.21	1.53	
3850	1-1/2 C.Y. capacity = 160 C.Y./hr.			B-12O	1,280	.013			.37	.72	1.09	1.35	
3900	3 C.Y. cap. = 250 C.Y./hr.			B-12T	2,000	.008			.24	.65	.89	1.07	
4000	For soft soil or sand, deduct										15%	15%	
4100	For heavy soil or stiff clay, add										60%	60%	
4200	For wet excavation with clamshell or dragline, add										100%	100%	
4250	All other equipment, add										50%	50%	
4400	Clamshell in sheeting or cofferdam, minimum			B-12H	160	.100			2.95	4.39	7.34	9.30	
4450	Maximum				60	.267			7.85	11.70	19.55	25	
8000	For hauling excavated material, see div. 02320-200												
410	EXCAVATING, BULK, DOZER Open site		R02315-400										410
2000	75 H.P., 50' haul, sand & gravel			B-10L	460	.026	C.Y.		.75	.63	1.38	1.84	
2020	Common earth			400	.030			.86	.73	1.59	2.11		
2040	Clay			250	.048			1.37	1.17	2.54	3.37		
2200	150' haul, sand & gravel			230	.052			1.49	1.27	2.76	3.66		
2220	Common earth			200	.060			1.72	1.46	3.18	4.22		
2240	Clay			125	.096			2.75	2.33	5.08	6.75		
2400	300' haul, sand & gravel			120	.100			2.86	2.43	5.29	7.05		
2420	Common earth			100	.120			3.43	2.91	6.34	8.45		
2440	Clay			65	.185			5.30	4.48	9.78	13		
3000	105 H.P., 50' haul, sand & gravel			B-10W	700	.017		.49	.62	1.11	1.43		
3020	Common earth			610	.020			.56	.71	1.27	1.64		
3040	Clay			385	.031			.89	1.12	2.01	2.60		
3200	150' haul, sand & gravel			310	.039			1.11	1.40	2.51	3.23		
3220	Common earth			270	.044			1.27	1.60	2.87	3.70		
3240	Clay			170	.071			2.02	2.54	4.56	5.90		
3300	300' haul, sand & gravel			140	.086			2.45	3.09	5.54	7.15		
3320	Common earth			120	.100			2.86	3.61	6.47	8.35		
3340	Clay			100	.120			3.43	4.33	7.76	10		
4000	200 H.P., 50' haul, sand & gravel			B-10B	1,400	.009		.25	.59	.84	1.02		
4020	Common earth			1,230	.010			.28	.67	.95	1.17		
4040	Clay			770	.016			.45	1.07	1.52	1.86		
4200	150' haul, sand & gravel			595	.020			.58	1.38	1.96	2.40		
4220	Common earth			516	.023			.67	1.60	2.27	2.77		
4240	Clay			325	.037			1.06	2.53	3.59	4.40		
4400	300' haul, sand & gravel			310	.039			1.11	2.66	3.77	4.61		
4420	Common earth			270	.044			1.27	3.05	4.32	5.30		
4440	Clay			170	.071			2.02	4.84	6.86	8.45		
5000	300 H.P., 50' haul, sand & gravel			B-10M	1,900	.006		.18	.54	.72	.88		
5020	Common earth			1,650	.007			.21	.63	.84	1.01		

Exhibit 3

Exhibit 3

Crews

Crew No.	Bare Costs		Incl. Sube O & P		Cost Per Labor-Hour	
	Hr.	Daily	Hr.	Daily	Bare Costs	Incl. O&P
Crew B-12J						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Grapple, 3 Ton, 5 C.Y.		736.40		810.05	46.03	50.63
16 L.H., Daily Totals		\$1208.40		\$1523.25	\$75.53	\$95.21
Crew B-12K						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Grapple, 3 Ton, 1 C.Y.		868.60		955.45	54.29	59.72
16 L.H., Daily Totals		\$1340.60		\$1668.65	\$83.79	\$104.30
Crew B-12L						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Power Shovel, 5 C.Y.		311.75		342.95		
1 F.E. Attachment, 5 C.Y.		38.80		42.70	21.91	24.10
16 L.H., Daily Totals		\$822.95		\$1098.85	\$51.41	\$68.68
Crew B-12M						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Power Shovel, 75 C.Y.		502.10		552.30		
1 F.E. Attachment, 75 C.Y.		43.80		48.20	34.12	37.53
16 L.H., Daily Totals		\$1017.90		\$1313.70	\$63.62	\$82.11
Crew B-12N						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Power Shovel, 1 C.Y.		640.80		704.90		
1 F.E. Attachment, 1 C.Y.		50.20		55.20	43.19	47.51
16 L.H., Daily Totals		\$1163.00		\$1473.30	\$72.69	\$92.09
Crew B-12O						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Power Shovel, 1.5 C.Y.		809.20		890.10		
1 F.E. Attachment, 1.5 C.Y.		110.00		121.00	57.45	63.20
16 L.H., Daily Totals		\$1391.20		\$1724.30	\$86.95	\$107.78
Crew B-12P						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Crawler Crane, 40 Ton		809.20		890.10		
1 Dragline Bucket, 1.5 C.Y.		29.60		32.55	52.43	57.67
16 L.H., Daily Totals		\$1310.80		\$1635.85	\$81.93	\$102.25
Crew B-12Q						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Hyd. Excavator, 5/8 C.Y.		393.20		432.50	24.58	27.03
16 L.H., Daily Totals		\$865.20		\$1145.70	\$54.08	\$71.61
Crew B-12R						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Hyd. Excavator, 1.5 C.Y.		705.00		775.50	44.06	48.47
16 L.H., Daily Totals		\$1177.00		\$1488.70	\$73.56	\$93.05

Crew No.	Bare Costs		Incl. Sube O & P		Cost Per Labor-Hour	
	Hr.	Daily	Hr.	Daily	Bare Costs	Incl. O&P
Crew B-12S						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Hyd. Excavator, 2.5 C.Y.		1700.00		1870.00	106.25	116.88
16 L.H., Daily Totals		\$2172.00		\$2583.20	\$135.75	\$161.46
Crew B-12T						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Crawler Crane, 75 Ton		1103.00		1213.30		
1 F.E. Attachment, 3 C.Y.		193.20		212.50	81.01	89.11
16 L.H., Daily Totals		\$1768.20		\$2139.00	\$110.51	\$133.68
Crew B-12V						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Crawler Crane, 75 Ton		1103.00		1213.30		
1 Dragline Bucket, 3 C.Y.		64.80		71.30	72.99	80.29
16 L.H., Daily Totals		\$1639.80		\$1997.80	\$102.49	\$124.87
Crew B-13						
1 Labor Foreman (outside)	\$25.45	\$203.60	\$39.60	\$316.80	\$25.46	\$39.25
4 Laborers	23.45	750.40	36.50	1168.00		
1 Equip. Oper. (crane)	32.35	258.80	48.90	391.20		
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Hyd. Crane, 25 Ton		724.80		797.30	12.94	14.24
56 L.H., Daily Totals		\$2150.80		\$2995.30	\$38.40	\$53.49
Crew B-13A						
1 Foreman	\$25.45	\$203.60	\$39.60	\$316.80	\$25.46	\$40.44
2 Laborers	23.45	375.20	36.50	584.00		
2 Equipment Operator	31.20	499.20	47.15	754.40		
2 Truck Drivers (heavy)	25.00	400.00	38.10	609.60		
1 Crane, 75 Ton		1103.00		1213.30		
1 F.E. Lder, 3.75 C.Y.		971.20		1068.30		
2 Dump Trucks, 12 Ton		706.40		777.05	49.65	54.62
56 L.H., Daily Totals		\$4258.60		\$5323.45	\$76.04	\$95.06
Crew B-13B						
1 Labor Foreman (outside)	\$25.45	\$203.60	\$39.60	\$316.80	\$25.46	\$39.25
4 Laborers	23.45	750.40	36.50	1168.00		
1 Equip. Oper. (crane)	32.35	258.80	48.90	391.20		
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Hyd. Crane, 55 Ton		972.40		1069.65	17.36	19.10
56 L.H., Daily Totals		\$2398.40		\$3267.65	\$42.82	\$58.35
Crew B-13C						
1 Labor Foreman (outside)	\$25.45	\$203.60	\$39.60	\$316.80	\$25.46	\$39.25
4 Laborers	23.45	750.40	36.50	1168.00		
1 Equip. Oper. (crane)	32.35	258.80	48.90	391.20		
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Crawler Crane, 100 Ton		1383.00		1521.30	24.70	27.17
56 L.H., Daily Totals		\$2809.00		\$3719.30	\$50.16	\$66.42
Crew B-14						
1 Labor Foreman (outside)	\$25.45	\$203.60	\$39.60	\$316.80	\$24.84	\$38.44
4 Laborers	23.45	750.40	36.50	1168.00		
1 Equip. Oper. (light)	29.80	238.40	45.05	360.40		
1 Backhoe Loader, 48 H.P.		178.60		196.45	3.72	4.09
48 L.H., Daily Totals		\$1371.00		\$2041.65	\$28.56	\$42.53

CREWS

Exhibit 4

02300 | Earthwork

02315 | Excavation and Fill

02315 Excavation and Fill			CREW	DAILY OUTPUT	LABOR- HOURS	UNIT	2002 BARE COSTS				TOTAL INCL O&P		
							MAT.	LABOR	EQUIP.	TOTAL			
400	1050	1-1/2 C.Y. cap. = 65 C.Y./hr.	R02315 -400	B-12P	520	.031	C.Y.		.91	1.61	2.52	3.14	400
	1100	3 C.Y. cap. = 112 C.Y./hr.		B-12V	900	.018			.52	1.30	1.82	2.22	
	1200	Front end loader, track mtd., 1-1/2 C.Y. cap. = 70 C.Y./hr.	R02315 -450	B-10N	560	.021			.61	.47	1.08	1.45	
	1250	2-1/2 C.Y. cap. = 95 C.Y./hr.		B-100	760	.016			.45	.66	1.11	1.41	
	1300	3 C.Y. cap. = 130 C.Y./hr.		B-10P	1,040	.012			.33	.66	.99	1.23	
	1350	5 C.Y. cap. = 160 C.Y./hr.		B-10Q	1,280	.009			.27	.76	1.03	1.25	
	1500	Wheel mounted, 3/4 C.Y. cap. = 45 C.Y./hr.		B-10R	360	.033			.95	.60	1.55	2.10	
	1550	1-1/2 C.Y. cap. = 80 C.Y./hr.		B-10S	640	.019			.54	.43	.97	1.30	
	1600	2-1/4 C.Y. cap. = 100 C.Y./hr.		B-10T	800	.015			.43	.46	.89	1.16	
	1601	3 C.Y. cap. = 140 C.Y./hr.		"	1,120	.011			.31	.33	.64	.83	
	1650	5 C.Y. cap. = 185 C.Y./hr.		B-10U	1,480	.008			.23	.53	.76	.93	
	1800	Hydraulic excavator, truck mtd, 1/2 C.Y. = 30 C.Y./hr.		B-12J	240	.067			1.97	3.07	5.04	6.35	
	1850	48 inch bucket, 1 C.Y. = 45 C.Y./hr.		B-12K	360	.044			1.31	2.41	3.72	4.63	
	3700	Shovel, 1/2 C.Y. capacity = 55 C.Y./hr.		B-12L	440	.036			1.07	.80	1.87	2.50	
	3750	3/4 C.Y. capacity = 85 C.Y./hr.		B-12M	680	.024			.69	.80	1.49	1.93	
	3800	1 C.Y. capacity = 120 C.Y./hr.		B-12N	960	.017			.49	.72	1.21	1.53	
	3850	1-1/2 C.Y. capacity = 160 C.Y./hr.		B-12O	1,280	.013			.37	.72	1.09	1.35	
	3900	3 C.Y. cap. = 250 C.Y./hr.		B-12T	2,000	.008			.24	.65	.89	1.07	
	4000	For soft soil or sand, deduct									15%	15%	
	4100	For heavy soil or stiff clay, add									60%	60%	
	4200	For wet excavation with clamshell or dragline, add									100%	100%	
	4250	All other equipment, add									50%	50%	
	4400	Clamshell in sheeting or cofferdam, minimum		B-12H	160	.100			2.95	4.39	7.34	9.30	
	4450	Maximum		"	60	.267			7.85	11.70	19.55	25	
	8000	For hauling excavated material, see div. 02320-200											
410	0010	EXCAVATING, BULK, DOZER Open site	R02315 -400										410
	2000	75 H.P., 50' haul, sand & gravel		B-10L	460	.026	C.Y.		.75	.63	1.38	1.84	
	2020	Common earth		400	.030			.86	.73	1.59	2.11		
	2040	Clay		250	.048			1.37	1.17	2.54	3.37		
	2200	150' haul, sand & gravel		230	.052			1.49	1.27	2.76	3.66		
	2220	Common earth		200	.060			1.72	1.46	3.18	4.22		
	2240	Clay		125	.096			2.75	2.33	5.08	6.75		
	2400	300' haul, sand & gravel		120	.100			2.86	2.43	5.29	7.05		
	2420	Common earth		100	.120			3.43	2.91	6.34	8.45		
	2440	Clay		65	.185			5.30	4.48	9.78	13		
	3000	105 H.P., 50' haul, sand & gravel		B-10W	700	.017		.49	.62	1.11	1.43		
	3020	Common earth		610	.020			.56	.71	1.27	1.64		
	3040	Clay		385	.031			.89	1.12	2.01	2.60		
	3200	150' haul, sand & gravel		310	.039			1.11	1.40	2.51	3.23		
	3220	Common earth		270	.044			1.27	1.60	2.87	3.70		
	3240	Clay		170	.071			2.02	2.54	4.56	5.90		
	3300	300' haul, sand & gravel		140	.086			2.45	3.09	5.54	7.15		
	3320	Common earth		120	.100			2.86	3.61	6.47	8.35		
	3340	Clay		100	.120			3.43	4.33	7.76	10		
	4000	200 H.P., 50' haul, sand & gravel		B-108	1,400	.009		.25	.59	.84	1.02		
	4020	Common earth		1,230	.010			.28	.67	.95	1.17		
	4040	Clay		770	.016			.45	1.07	1.52	1.86		
	4200	150' haul, sand & gravel		595	.020			.58	1.38	1.96	2.40		
	4220	Common earth		516	.023			.67	1.60	2.27	2.77		
	4240	Clay		325	.037			1.06	2.53	3.59	4.40		
	4400	300' haul, sand & gravel		310	.039			1.11	2.66	3.77	4.61		
	4420	Common earth		270	.044			1.27	3.05	4.32	5.30		
	4440	Clay		170	.071			2.02	4.84	6.86	9.45		
	5000	300 H.P., 50' haul, sand & gravel		B-10M	1,900	.006		.18	.54	.72	.88		
	5020	Common earth		1,650	.007			.21	.63	.84	1.01		

Exhibit 5

Crews

Crew No.	Bare Costs		Incl. Subs O & P		Cost Per Labor-Hour	
	Hr.	Daily	Hr.	Daily	Bare Costs	Incl. O&P
Crew B-12J						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Grapple, 3 Ton, 1 C.Y.		736.40		810.05	46.03	50.53
16 L.H., Daily Totals		\$1208.40		\$1523.25	\$75.53	\$95.21
Crew B-12K						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Grapple, 3 Ton, 1 C.Y.		868.60		955.45	54.29	59.72
16 L.H., Daily Totals		\$1340.60		\$1668.65	\$84.79	\$104.30
Crew B-12L						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Power Shovel, .5 C.Y.		311.75		342.95		
1 F.E. Attachment, .5 C.Y.		38.80		42.70	21.91	24.10
16 L.H., Daily Totals		\$822.55		\$1098.85	\$51.41	\$68.68
Crew B-12M						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Power Shovel, .75 C.Y.		502.10		552.30		
1 F.E. Attachment, .75 C.Y.		43.80		48.20	34.12	37.53
16 L.H., Daily Totals		\$1017.90		\$1313.70	\$63.62	\$82.11
Crew B-12N						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Power Shovel, 1 C.Y.		640.80		704.90		
1 F.E. Attachment, 1 C.Y.		50.20		55.20	43.19	47.51
16 L.H., Daily Totals		\$1163.00		\$1473.30	\$72.69	\$92.09
Crew B-12O						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Power Shovel, 1.5 C.Y.		809.20		890.10		
1 F.E. Attachment, 1.5 C.Y.		110.00		121.00	57.45	63.20
16 L.H., Daily Totals		\$1391.20		\$1724.30	\$86.95	\$107.78
Crew B-12P						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Grapple, 40 Ton		809.20		890.10		
1 Dragline Bucket, 1.5 C.Y.		29.60		32.55	52.43	57.67
16 L.H., Daily Totals		\$1310.80		\$1635.85	\$81.93	\$102.25
Crew B-12Q						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Hyd. Excavator, 5/8 C.Y.		393.20		432.50	24.58	27.03
16 L.H., Daily Totals		\$865.20		\$1145.70	\$54.08	\$71.61
Crew B-12R						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Hyd. Excavator, 1.5 C.Y.		705.00		775.50	44.06	48.47
16 L.H., Daily Totals		\$1177.00		\$1488.70	\$73.56	\$93.05

Crew No.	Bare Costs		Incl. Subs O & P		Cost Per Labor-Hour	
	Hr.	Daily	Hr.	Daily	Bare Costs	Incl. O&P
Crew B-12S						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Hyd. Excavator, 2.5 C.Y.		1700.00		1870.00	106.25	116.88
16 L.H., Daily Totals		\$2172.00		\$2883.20	\$135.75	\$161.46
Crew B-12T						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Crawler Crane, 75 Ton		1103.00		1213.30		
1 F.E. Attachment, 3 C.Y.		193.20		212.50	81.01	89.11
16 L.H., Daily Totals		\$1768.20		\$2139.00	\$110.51	\$133.69
Crew B-12V						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Crawler Crane, 75 Ton		1103.00		1213.30		
1 Dragline Bucket, 3 C.Y.		64.00		71.30	72.99	80.29
16 L.H., Daily Totals		\$1639.80		\$1997.80	\$102.49	\$124.87
Crew B-13						
1 Labor Foreman (outside)	\$25.45	\$203.60	\$39.60	\$316.80	\$25.45	\$39.25
4 Laborers	23.45	750.40	36.50	1168.00		
1 Equip. Oper. (crane)	32.35	258.80	48.90	391.20		
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Hyd. Crane, 25 Ton		724.80		797.30	12.94	14.24
56 L.H., Daily Totals		\$2150.80		\$2995.30	\$38.40	\$53.49
Crew B-13A						
1 Foreman	\$25.45	\$203.60	\$39.60	\$316.80	\$25.45	\$40.44
2 Laborers	23.45	375.20	36.50	584.00		
2 Equipment Operator	31.20	499.20	47.15	754.40		
2 Truck Drivers (heavy)	25.00	400.00	38.10	609.60		
1 Crane, 75 Ton		1103.00		1213.30		
1 F.E. Loader, 3.75 C.Y.		971.20		1068.30		
2 Dump Trucks, 12 Ton		706.40		777.05	49.65	54.52
56 L.H., Daily Totals		\$4258.60		\$5323.45	\$76.04	\$95.66
Crew B-13B						
1 Labor Foreman (outside)	\$25.45	\$203.60	\$39.60	\$316.80	\$25.45	\$39.25
4 Laborers	23.45	750.40	36.50	1168.00		
1 Equip. Oper. (crane)	32.35	258.80	48.90	391.20		
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Hyd. Crane, 55 Ton		972.40		1069.65	17.36	19.10
56 L.H., Daily Totals		\$2298.40		\$3267.65	\$42.82	\$58.35
Crew B-13C						
1 Labor Foreman (outside)	\$25.45	\$203.60	\$39.60	\$316.80	\$25.45	\$39.25
4 Laborers	23.45	750.40	36.50	1168.00		
1 Equip. Oper. (crane)	32.35	258.80	48.90	391.20		
1 Equip. Oper. Oiler	26.65	213.20	40.25	322.00		
1 Crawler Crane, 100 Ton		1383.00		1521.30	24.70	27.17
56 L.H., Daily Totals		\$2909.00		\$3719.30	\$50.16	\$66.42
Crew B-14						
1 Labor Foreman (outside)	\$25.45	\$203.60	\$39.60	\$316.80	\$24.84	\$38.44
4 Laborers	23.45	750.40	36.50	1168.00		
1 Equip. Oper. (right)	29.80	238.40	45.05	360.40		
1 Backhoe Loader, 48 H.P.		178.60		196.45	3.72	4.09
48 L.H., Daily Totals		\$1371.00		\$2041.65	\$28.56	\$42.53

CREWS

Exhibit 6

Crew No.	Bare Costs		Incl. Subs O & P		Cost Per Labor-Hour	
	Hr.	Daily	Hr.	Daily	Bare Costs	Incl. O&P
Crew B-11L						
1 Equipment Oper. (med.)	\$31.20	\$249.60	\$47.15	\$377.20	\$27.33	\$41.83
1 Laborer	23.45	187.60	36.50	292.00		
1 Grader, 30,000 Lbs.		431.60		474.75	26.98	29.67
16 L.H., Daily Totals		\$868.80		\$1143.95	\$54.31	\$71.50
Crew B-11M						
1 Equipment Oper. (med.)	\$31.20	\$249.60	\$47.15	\$377.20	\$27.33	\$41.83
1 Laborer	23.45	187.60	36.50	292.00		
1 Backhoe Loader, 80 H.P.		215.60		237.15	13.48	14.82
16 L.H., Daily Totals		\$652.80		\$906.35	\$40.81	\$56.65
Crew B-11N						
1 Labor Foreman	\$25.45	\$203.60	\$39.60	\$316.80	\$26.43	\$40.28
2 Equipment Operators (med.)	31.20	499.20	47.15	754.40		
6 Truck Drivers (reg.)	25.00	1200.00	38.10	1828.80		
1 F.E. Loader, 5.5 C.Y.		777.60		855.35		
1 Dozer, 400 H.P.		1374.00		1511.40		
6 Off Hwy. Tks. 50 Ton		8184.00		9002.40	143.55	157.91
72 L.H., Daily Totals		\$12238.40		\$14269.15	\$169.98	\$198.19
Crew B-11Q						
1 Equipment Operator (med.)	\$31.20	\$249.60	\$47.15	\$377.20	\$28.62	\$43.60
5 Laborer	23.45	93.80	36.50	146.00		
1 Dozer, 140 H.P.		464.40		510.85	38.70	42.57
12 L.H., Daily Totals		\$807.80		\$1034.05	\$67.32	\$86.17
Crew B-11R						
1 Equipment Operator (med.)	\$31.20	\$249.60	\$47.15	\$377.20	\$28.62	\$43.60
5 Laborer	23.45	93.80	36.50	146.00		
1 Dozer, 215 H.P.		823.40		905.75	68.62	75.48
12 L.H., Daily Totals		\$1166.80		\$1428.95	\$97.24	\$119.08
Crew B-11S						
1 Equipment Operator	\$31.20	\$249.60	\$47.15	\$377.20	\$28.62	\$43.60
5 Laborer	23.45	93.80	36.50	146.00		
1 Dozer, 285 H.P.		1094.00		1137.40	86.17	94.78
12 L.H., Daily Totals		\$1377.40		\$1660.60	\$114.79	\$138.38
Crew B-11T						
1 Equipment Operator (med.)	\$31.20	\$249.60	\$47.15	\$377.20	\$28.62	\$43.60
5 Laborer	23.45	93.80	36.50	146.00		
1 Dozer, 370 H.P.		1374.00		1511.40	114.50	125.95
12 L.H., Daily Totals		\$1717.40		\$2034.60	\$143.12	\$169.55
Crew B-11U						
1 Equipment Operator (med.)	\$31.20	\$249.60	\$47.15	\$377.20	\$28.62	\$43.60
5 Laborer	23.45	93.80	36.50	146.00		
1 Dozer, 520 H.P.		1832.00		2015.20	152.67	167.93
12 L.H., Daily Totals		\$2175.40		\$2538.40	\$181.29	\$211.53
Crew B-11V						
3 Laborer	\$23.45	\$562.80	\$36.50	\$876.00	\$23.45	\$36.50
1 Roll. Compact., 2K lbs		123.20		135.50	5.13	5.65
24 L.H., Daily Totals		\$686.00		\$1011.50	\$28.58	\$42.15
Crew B-12						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. (digger)	26.65	213.20	40.25	322.00		
16 L.H., Daily Totals		\$472.00		\$713.20	\$29.50	\$44.58

Crew No.	Bare Costs		Incl. Subs O & P		Cost Per Labor-Hour	
	Hr.	Daily	Hr.	Daily	Bare Costs	Incl. O&P
Crew B-12A						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. (digger)	26.65	213.20	40.25	322.00		
1 Hyd. Excavator, 1 C.Y.		563.40		619.75	35.21	38.73
16 L.H., Daily Totals		\$1035.40		\$1332.95	\$64.71	\$83.31
Crew B-12B						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. (digger)	26.65	213.20	40.25	322.00		
1 Hyd. Excavator, 1.5 C.Y.		705.00		775.50	44.06	48.47
16 L.H., Daily Totals		\$1177.00		\$1488.70	\$73.56	\$93.06
Crew B-12C						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. (digger)	26.65	213.20	40.25	322.00		
1 Hyd. Excavator, 2 C.Y.		962.20		1058.40	60.14	66.15
16 L.H., Daily Totals		\$1434.20		\$1771.60	\$89.64	\$110.73
Crew B-12D						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. (digger)	26.65	213.20	40.25	322.00		
1 Hyd. Excavator, 3.5 C.Y.		2094.00		2303.40	130.88	143.96
16 L.H., Daily Totals		\$2566.00		\$3016.60	\$160.38	\$188.54
Crew B-12E						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. (digger)	26.65	213.20	40.25	322.00		
1 Hyd. Excavator, 5 C.Y.		319.80		361.80	19.99	21.99
16 L.H., Daily Totals		\$791.80		\$1065.00	\$49.49	\$66.57
Crew B-12F						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. (digger)	26.65	213.20	40.25	322.00		
1 Hyd. Excavator, .75 C.Y.		457.00		502.70	28.56	31.42
16 L.H., Daily Totals		\$829.00		\$1215.90	\$58.06	\$76.00
Crew B-12G						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. (digger)	26.65	213.20	40.25	322.00		
1 Power Shovel, 5 C.Y.		311.75		342.95		
1 Clamshell Bucket, 5 C.Y.		42.40		46.65	22.13	24.35
16 L.H., Daily Totals		\$826.15		\$1102.80	\$51.63	\$68.93
Crew B-12H						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. (digger)	26.65	213.20	40.25	322.00		
1 Power Shovel, 1 C.Y.		640.80		704.90		
1 Clamshell Bucket, 1 C.Y.		61.60		67.75	43.90	48.29
16 L.H., Daily Totals		\$1174.40		\$1485.85	\$73.40	\$92.87
Crew B-12I						
1 Equip. Oper. (crane)	\$32.35	\$258.80	\$48.90	\$391.20	\$29.50	\$44.58
1 Equip. Oper. (digger)	26.65	213.20	40.25	322.00		
1 Power Shovel, .75 C.Y.		502.10		552.30		
1 Dragline Bucket, .75 C.Y.		18.20		20.00	32.52	35.77
16 L.H., Daily Totals		\$992.30		\$1285.50	\$62.02	\$80.36

Exhibit 7

01500 | Temporary Facilities & Controls

01590 | Equipment Rental

			UNIT	HOURLY OPER. COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY	
100	0010 CONCRETE EQUIPMENT RENTAL	R01590-100							100
	0100 without operators								
	0200 Bucket, concrete lightweight, 1/2 C.Y.	R03310-090	Ea.	.20	24	72	216	16	
	0300 1 C.Y.			.20	35	105	315	22.60	
	0400 1-1/2 C.Y.			.25	38.50	115	345	25	
	0500 2 C.Y.			.30	48.50	145	435	31.40	
	0600 Cart, concrete, self propelled, operator walking, 10 C.F.			1.30	60	180	540	46.40	
	0700 Operator riding, 18 C.F.			1.80	88.50	265	795	67.40	
	0800 Conveyor for concrete, portable, gas, 16' wide, 26' long			5.45	153	460	1,375	135.60	
	0900 46' long			5.70	190	570	1,700	159.60	
	1000 56' long			5.80	205	615	1,850	169.40	
	1100 Core drill, electric, 2-1/2 H.P., 1" to 8" bit diameter			1.87	74.50	224	670	59.75	
	1150 11 H.P., 8" to 18" cores			5.93	76	228	685	93.05	
	1200 Finisher, concrete floor, gas, riding trowel, 48" diameter			3.45	88.50	265	795	80.60	
	1300 Gas, manual, 3 blade, 36" trowel			.85	44	132	395	33.20	
	1400 4 blade, 48" trowel			1.25	49	147	440	39.40	
	1500 Float, hand-operated (Bull float) 48" wide			.08	12	36	108	7.85	
	1570 Curb builder, 14 H.P., gas, single screw			6.05	82.50	248	745	98	
	1590 Double screw			13.55	103	308	925	170	
	1600 Grinder, concrete and terrazzo, electric, floor			1.88	78	234	700	61.85	
	1700 Wall grinder			.94	39	117	350	30.90	
	1800 Mixer, powered, mortar and concrete, gas, 6 C.F., 18 H.P.			3.85	67.50	203	610	71.40	
	1900 10 C.F., 25 H.P.			4.90	68	204	610	80	
	2000 16 C.F.			5.10	90	270	810	94.80	
	2100 Concrete, stationary, tilt drum, 2 C.Y.			2.95	237	710	2,125	165.60	
	2120 Pump, concrete, truck mounted, 4" line, 80' boom			13.55	955	2,865	8,600	681.40	
	2140 5" line, 110' boom			17.50	1,325	3,985	12,000	937	
	2160 Mud jack, 50 C.F. per hr.			4.37	117	350	1,050	104.95	
	2180 225 C.F. per hr.			5.40	253	760	2,275	195.20	
	2600 Saw, concrete, manual, gas, 18 H.P.			2.70	65	195	585	60.60	
	2650 Self-propelled, gas, 30 H.P.			5.55	98.50	295	885	103.40	
	2700 Vibrators, concrete, electric, 60 cycle, 2 H.P.			.39	23.50	70	210	17.10	
	2800 3 H.P.			.58	33.50	100	300	24.65	
	2900 Gas engine, 5 H.P.			.80	35	105	315	27.40	
	3000 8 H.P.			1.20	43.50	130	390	35.60	
	3100 Concrete transit mixer, hydraulic drive								
	3120 6 x 4, 250 H.P., 8 C.Y., rear discharge			28.35	765	2,300	6,900	686.80	
	3200 Front discharge			32.05	835	2,500	7,500	756.40	
	3300 6 x 6, 285 H.P., 12 C.Y., rear discharge			31.20	850	2,550	7,650	759.60	
	3400 Front discharge			32.95	900	2,700	8,100	803.60	
200	0010 EARTHWORK EQUIPMENT RENTAL Without operators	R01590-100							200
	0040 Aggregate spreader, push type 8' to 12' wide		Ea.	1.25	86.50	260	780	62	
	0050 Augers for truck or trailer mounting, vertical drilling	R02315-300							
	0055 Fence post auger, truck mounted		Ea.	7.35	530	1,595	4,775	377.80	
	0060 4" to 36" diam., 54 H.P., gas, 10' spindle travel	R02315-400		19.05	665	2,000	6,000	552.40	
	0070 14" spindle travel			21.75	830	2,495	7,475	673	
	0075 Auger, truck mounted, vertical drilling, to 25' depth	R02315-450		71.60	2,375	7,100	21,300	1,993	
	0080 Auger, horizontal boring machine, 12" to 36" diameter, 45 H.P.			8.15	268	805	2,425	226.20	
	0090 12" to 48" diameter, 65 H.P.	R02455-800		12.25	610	1,835	5,500	465	
	0100 Excavator, diesel hydraulic, crawler mounted, 1/2 C.Y. cap.			10.60	390	1,175	3,525	319.80	
	0120 5/8 C.Y. capacity			12.90	485	1,450	4,350	393.20	
	0140 3/4 C.Y. capacity			15.50	555	1,665	5,000	457	
	0150 1 C.Y. capacity			20.05	670	2,015	6,050	563.40	
	0200 1-1/2 C.Y. capacity			24.75	845	2,535	7,600	705	
	0300 2 C.Y. capacity			33.90	1,150	3,455	10,400	962.20	
	0320 2-1/2 C.Y. capacity			61.30	2,025	6,050	18,200	1,700	
	0340 3-1/2 C.Y. capacity			75.70	2,475	7,440	22,300	2,094	
	0341 Attachments								

01500 | Temporary Facilities & Controls

01590 | Equipment Rental

			UNIT	HOURLY OPER. COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY	
200	0342	Bucket thumbs	R01590 -100	Ea.	1.25	205	615	1,850	133
	0345	Grapples			1	202	605	1,825	129
	0350	Gradall type, truck mounted, 3 ton @ 15' radius, 5/8 C.Y.	R02315 -300		24.80	895	2,690	8,075	736.40
	0370	1 C.Y. capacity			28.95	1,050	3,185	9,550	868.60
	0400	Backhoe-loader, 40 to 45 H.P., 5/8 C.Y. capacity	R02315 -400		5.35	188	565	1,700	155.80
	0450	45 H.P. to 60 H.P., 3/4 C.Y. capacity			6.95	205	615	1,850	178.60
	0460	80 H.P., 1-1/4 C.Y. capacity	R02315 -450		9.20	237	710	2,125	215.60
	0470	112 H.P., 1-1/2 C.Y. capacity			12.80	415	1,240	3,725	350.40
	0480	Attachments							
	0482	Compactor, 20,000 lb	R02455 -900		1.95	173	520	1,550	119.60
	0485	Hydraulic hammer, 750 ft-lbs			1.40	202	605	1,825	132.20
	0486	Hydraulic hammer, 1200 ft-lbs			1.90	245	735	2,200	162.20
	0500	Brush chipper, gas engine, 6" cutter head, 35 H.P.			3.80	140	420	1,250	114.40
	0550	12" cutter head, 130 H.P.			7.20	208	625	1,875	182.60
	0600	15" cutter head, 165 H.P.			11.70	228	685	2,050	230.60
	0750	Bucket, clamshell, general purpose, 3/8 C.Y.			.70	53.50	160	480	37.60
	0800	1/2 C.Y.			.80	60	180	540	42.40
	0850	3/4 C.Y.			.90	66.50	200	600	47.20
	0900	1 C.Y.			.95	90	270	810	61.60
	0950	1-1/2 C.Y.			1.45	115	345	1,025	80.60
	1000	2 C.Y.			1.60	140	420	1,250	96.80
	1010	Bucket, dragline, medium duty, 1/2 C.Y.			.40	23	69	207	17
	1020	3/4 C.Y.			.45	24.50	73	219	18.20
	1030	1 C.Y.			.45	26	78	234	19.20
	1040	1-1/2 C.Y.			.70	40	120	360	29.60
	1050	2 C.Y.			.75	55	165	495	39
	1070	3 C.Y.			1.10	93.50	280	840	64.80
	1200	Compactor, roller, 2 drum, 2000 lb., operator walking			4.65	143	430	1,300	123.20
	1250	Rammer compactor, gas, 1000 lb. blow			.95	40	120	360	31.60
	1300	Vibratory plate, gas, 13" plate, 1000 lb. blow			.75	38.50	115	345	29
	1350	24" plate, 5000 lb. blow			1.95	66.50	200	600	55.60
	1370	Curb builder/extruder, 14 H.P., gas, single screw			6.05	66.50	200	600	88.40
	1390	Double screw			13.55	110	330	990	174.40
	1750	Extractor, piling, see lines 2500 to 2750							
	1860	Grader, self-propelled, 25,000 lb.							
	1910	30,000 lb.			15.30	420	1,265	3,800	375.40
	1920	40,000 lb.			17.20	490	1,470	4,400	431.60
	1930	55,000 lb.			25.95	740	2,225	6,675	652.60
	1950	Hammer, pavement demo., hyd., gas, self-prop., 1000 to 1250 lb.			34.65	1,050	3,130	9,400	903.20
	2000	Diesel 1300 to 1500 lb.			12.55	415	1,245	3,725	349.40
	2050	Pile driving hammer, steam or air, 4150 ft.-lb. @ 225 BPM			18.75	555	1,670	5,000	484
	2100	8750 ft.-lb. @ 145 BPM			1.55	282	845	2,525	181.40
	2150	15,000 ft.-lb. @ 60 BPM			2.10	470	1,405	4,225	297.80
	2200	24,450 ft.-lb. @ 111 BPM			2.20	505	1,515	4,550	320.60
	2250	Leads, 15,000 ft.-lb. hammers			2.90	550	1,645	4,925	352.20
	2300	24,450 ft.-lb. hammers and heavier							
	2350	Diesel type hammer, 22,400 ft.-lb.			.45	6.65	20	60	7.60
	2400	41,300 ft.-lb.			.65	10.65	32	96	11.60
	2450	141,000 ft.-lb.			13.25	585	1,760	5,275	458
	2500	Vib. elec. hammer/extractor, 200 KW diesel generator, 34 H.P.			20.10	690	2,070	6,200	574.80
	2550	80 H.P.			33.10	1,550	4,625	13,900	1,190
	2600	150 H.P.			21.10	700	2,095	6,275	587.80
	2700	Extractor, steam or air, 700 ft.-lb.			39.05	1,025	3,110	9,325	934.40
	2750	1000 ft.-lb.			56.40	1,575	4,700	14,100	1,391
	3000	Roller, tandem, gas, 3 to 5 ton			1.70	217	650	1,950	143.60
	3050	Diesel, 8 to 12 ton			1.95	315	945	2,825	204.60
	3100	Towed type, vibratory, gas 12.5 H.P., 2 ton			5.15	127	380	1,150	117.20
	3150	Sheepsfoot, double 60" x 60"			4.30	223	670	2,000	168.40
					2.70	255	765	2,300	174.60
					.85	110	330	990	72.80

01500 | Temporary Facilities & Controls

01590 | Equipment Rental

			UNIT	HOURLY OPER. COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY	
200	3200	Pneumatic tire diesel roller, 12 ton	R01590-100	Ea.	6.10	315	945	2,825	237.80
	3250	21 to 25 ton			10.25	590	1,775	5,325	437
	3300	Sheepsfoot roller, self-propelled, 4 wheel, 130 H.P.	R02315-300		29.80	875	2,630	7,900	764.40
	3320	300 H.P.			41.55	975	2,930	8,800	918.40
	3350	Vibratory steel drum & pneumatic tire, diesel, 18,000 lb.	R02315-400		11.30	355	1,065	3,200	303.40
	3400	29,000 lb.			18.95	470	1,415	4,250	434.60
	3450	Scrapers, towed type, 9 to 12 C.Y. capacity	R02315-450		3.37	161	482	1,450	123.35
	3500	12 to 17 C.Y. capacity			3.58	214	643	1,925	157.25
	3550	Scrapers, self-propelled, 4 x 4 drive, 2 engine, 14 C.Y. capacity	R02495-600		69.40	1,450	4,320	13,000	1,419
	3600	2 engine, 24 C.Y. capacity			101.35	2,275	6,815	20,400	2,174
	3650	Self-loading, 11 C.Y. capacity			31.35	825	2,470	7,400	744.80
	3700	22 C.Y. capacity			61.35	1,475	4,410	13,200	1,373
	3710	Screening plant 110 hp. w/ 5' x 10' screen			15.85	370	1,115	3,350	349.80
	3720	5' x 16' screen			17.20	475	1,420	4,250	421.60
	3850	Shovels, see Cranes division 01590-600							
	3860	Shovel/backhoe bucket, 1/2 C.Y.	Ea.	.85	53.50	160	480		38.80
	3870	3/4 C.Y.		.85	61.50	185	555		43.80
	3880	1 C.Y.		.90	71.50	215	645		50.20
	3890	1 1/2 C.Y.		1	170	510	1,525		110
	3910	3 C.Y.		1.15	305	920	2,750		193.20
	4110	Tractor, crawler, with bulldozer, torque converter, diesel 75 H.P.			12.15	325	970	2,900	291.20
	4150	105 H.P.			17.20	490	1,475	4,425	432.80
	4200	140 H.P.			19.80	510	1,530	4,600	464.40
	4260	200 H.P.			29.80	975	2,925	8,775	823.40
	4310	300 H.P.			39.20	1,200	3,600	10,800	1,034
	4360	410 H.P.			53.65	1,575	4,725	14,200	1,374
	4380	700 H.P.			109.65	3,400	10,235	30,700	2,924
	4400	Loader, crawler, torque conv., diesel, 1 1/2 C.Y., 80 H.P.			9.70	310	930	2,800	263.60
	4450	1 1/2 to 1 3/4 C.Y., 95 H.P.			11.70	380	1,145	3,425	322.60
	4510	1 3/4 to 2 1/4 C.Y., 130 H.P.			16.05	615	1,850	5,550	498.40
	4530	2 1/2 to 3 1/4 C.Y., 190 H.P.			23.20	840	2,525	7,575	690.60
	4560	3 1/2 to 5 C.Y., 275 H.P.			31.15	1,200	3,610	10,800	971.20
	4610	Tractor loader, wheel, torque conv., 4 x 4, 1 to 1 1/4 C.Y., 65 H.P.			10.05	223	670	2,000	214.40
	4620	1 1/2 to 1 3/4 C.Y., 80 H.P.			11.05	315	940	2,825	276.40
	4650	1 3/4 to 2 C.Y., 100 H.P.			11.55	335	1,000	3,000	292.40
	4710	2 1/2 to 3 1/2 C.Y., 130 H.P.			14.55	425	1,270	3,800	370.40
	4730	3 to 4 1/2 C.Y., 170 H.P.			18.10	565	1,700	5,100	484.80
	4760	5 1/4 to 5 3/4 C.Y., 270 H.P.			32.95	855	2,570	7,700	777.60
	4810	7 to 8 C.Y., 375 H.P.			50.20	1,100	3,305	9,925	1,063
	4870	12 1/2 C.Y., 690 H.P.			93.50	2,350	7,015	21,000	2,151
	4880	Wheeled, skid steer, 10 C.F., 30 H.P. gas			5.85	140	420	1,250	130.80
	4890	1 C.Y., 78 H.P., diesel			7.60	223	670	2,000	194.80
	4891	Attachments for all skid steer loaders							
	4892	Auger	Ea.	.46	77.50	232	695		50.10
	4893	Backhoe		.64	107	320	960		69.10
	4894	Broom		.66	110	331	995		71.50
	4895	Forks		21	34.50	104	310		22.50
	4896	Grapple		54	90	270	810		58.30
	4897	Concrete hammer		1.03	171	513	1,550		110.85
	4898	Tree spade		.94	157	471	1,425		101.70
	4899	Trencher		.71	119	356	1,075		76.90
	4900	Trencher, chain, boom type, gas, operator walking, 12 H.P.		2	117	350	1,050		86
	4910	Operator riding, 40 H.P.		5.75	245	735	2,200		193
	5000	Wheel type, diesel, 4' deep, 12' wide		12.80	645	1,930	5,800		488.40
	5100	Diesel, 6' deep, 20' wide		23.70	940	2,820	8,450		753.60
	5150	Ladder type, diesel, 5' deep, 8' wide		14.80	505	1,510	4,525		420.40
	5200	Diesel, 8' deep, 16' wide		32.45	985	2,950	8,850		849.60
	5250	Truck, dump, tandem, 12 ton payload		19.90	325	970	2,900		353.20

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01590 Equipment Rental			UNIT	HOURLY OPER. COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY		
200	5300	Three axle dump, 16 ton payload	R01590-100	Ea.	27.20	420	1,265	3,800	470.60	200
	5350	Dump trailer only, rear dump, 16-1/2 C.Y.			4.05	145	435	1,300	119.40	
	5400	20 C.Y.	R02315-300		4.50	155	465	1,400	129	
	5450	Flatbed, single axle, 1-1/2 ton rating			11.45	107	320	960	155.60	
	5500	3 ton rating	R02315-400		14.55	110	330	990	182.40	
	5550	Off highway rear dump, 25 ton capacity			40.45	1,000	3,020	9,050	927.60	
	5600	35 ton capacity	R02315-450		41.50	1,050	3,165	9,500	965	
400	0010	GENERAL EQUIPMENT RENTAL Without operators	R02250-450	Ea.	1.20	71.50	215	645	52.60	400
	0150	Aerial lift, scissor type, to 15' high, 1000 lb. cap., electric			1.50	107	320	960	76	
	0160	To 25' high, 2000 lb. capacity	R02250-400		7	263	790	2,375	214	
	0170	Telescoping boom to 40' high, 750 lb. capacity, gas			8.75	390	1,170	3,500	304	
	0180	1000 lb. capacity	R02315-300		8.85	400	1,200	3,600	310.80	
	0190	To 60' high, 750 lb. capacity			.32	27.50	83	249	19.15	
	0195	Air compressor, portable, 6.5 CFM, electric			.36	41.50	125	375	27.90	
	0196	gasoline			4.20	50	150	450	63.60	
	0200	Air compressor, portable, gas engine, 60 C.F.M.			7.40	63.50	190	570	97.20	
	0300	160 C.F.M.			8.75	108	325	975	135	
	0400	Diesel engine, rotary screw, 250 C.F.M.			10.25	135	405	1,225	163	
	0500	365 C.F.M.			16.95	213	640	1,925	263.60	
	0600	600 C.F.M.			22	250	750	2,250	326	
	0700	750 C.F.M.			3%	5%	5%	5%		
	0800	For silenced models, small sizes, add			5%	7%	7%	7%		
	0900	Large sizes, add								
	0920	Air tools and accessories								
	0930	Breaker, pavement, 60 lb.		Ea.	.20	25	75	225	16.60	
	0940	80 lb.			.20	33.50	100	300	21.60	
	0950	Drills, hand (jackhammer) 65 lb.			.25	22.50	67	201	15.40	
	0960	Track or wagon, swing boom, 4" drifter			30.05	485	1,450	4,350	530.40	
	0970	5" drifter			40.60	780	2,345	7,025	793.80	
	0980	Dust control per drill			1.24	15	45	135	18.90	
	0990	Hammer, chipping, 12 lb.			.20	22	66	198	14.80	
	1000	Hose, air with couplings, 50' long, 3/4" diameter			.02	4	12	36	2.55	
	1100	1" diameter			.03	5.35	16	48	3.45	
	1200	1-1/2" diameter			.04	7.35	22	66	4.70	
	1300	2" diameter			.10	16.35	49	147	10.60	
	1400	2-1/2" diameter			.11	19	57	171	12.30	
	1410	3" diameter			.16	27.50	82	246	17.70	
	1450	Drill, steel, 7/8" x 2'			.05	5	15	45	3.40	
	1460	7/8" x 6'			.05	6	18	54	4	
	1520	Molt points			.02	4	12	36	2.55	
	1525	Pneumatic nader w/accessories			.43	28.50	85	255	20.45	
	1530	Sheeting driver for 60 lb. breaker			.10	10	30	90	6.80	
	1540	For 90 lb. breaker			.15	15	45	135	10.20	
	1550	Spade, 25 lb.			.20	6.65	20	60	5.60	
	1560	Tamper, single, 35 lb.			.44	29.50	88	264	21.10	
	1570	Triple, 140 lb.			.88	44	132	395	33.45	
	1580	Wrenches, impact, air powered, up to 3/4" bolt			.10	18.35	55	165	11.80	
	1590	Up to 1-1/4" bolt			.15	33.50	100	300	21.20	
	1600	Barricades, barrels, reflectorized, 1 to 50 barrels			.02	3.33	10	30	2.15	
	1610	100 to 200 barrels			.02	2.53	7.60	23	1.70	
	1620	Barrels with flashers, 1 to 50 barrels			.02	4	12	36	2.55	
	1630	100 to 200 barrels			.02	3.20	9.60	29	2.10	
	1640	Barrels with steady burn type C lights			.03	5.35	16	48	3.45	
	1650	Illuminated board, trailer mounted, with generator			.35	125	375	1,125	77.80	
	1670	Portable, stock, with flashers, 1 to 6 units			.02	4	12	36	2.55	
	1680	25 to 50 units			.02	3.73	11.20	33.50	2.40	
	1690	Butt fusion machine, electric			12.65	435	1,300	3,900	361.20	

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01590 | Equipment Rental

			UNIT	HOURLY OPER. COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY	
1695	Electro fusion machine	R02250 -450	EA.	5.75	175	525	1,575	151	400
1700	Carts, brick, hand powered, 1000 lb. capacity			.13	21.50	65	195	14.05	
1800	Gas engine, 1500 lb., 7-1/2" lift	R02250 -400		3.07	108	324	970	89.35	
1830	Distributor, asphalt, trailer mtd, 2000 gal., 38 H.P. diesel			3.40	405	1,220	3,650	271.20	
1840	3000 gal., 38 H.P. diesel	R02315 -300		3.95	425	1,280	3,850	287.60	
1850	Drill, rotary hammer, electric, 1-1/2" diameter			.42	25.50	77	231	18.75	
1860	Carbide bit for above			.03	5.35	16	48	3.45	
1870	Emulsion sprayer, 65 gal., 5 H.P. gas engine			1.51	59	177	530	47.50	
1880	200 gal., 5 H.P. engine			2.50	76.50	230	690	66	
1900	Fencing, see division 01560-250 & 02820								
1920	Floodlight, mercury, vapor or quartz, on tripod								
1930	1000 watt		EA.	.28	20	60	180	14.25	
1940	2000 watt			.48	35	105	315	24.85	
1960	Floodlights, trailer mounted with generator, 2-1000 watt lights			1.90	108	325	975	80.20	
2020	Fordlift, wheeled, for brick, 18", 3000 lb., 2 wheel drive, gas			12.50	183	550	1,650	210	
2040	28", 4000 lb., 4 wheel drive, diesel			10.15	252	755	2,275	232.20	
2100	Generator, electric, gas engine, 1.5 KW to 3 KW			1.30	33.50	100	300	30.40	
2200	5 KW			1.90	50	150	450	45.20	
2300	10 KW			2.35	112	335	1,000	85.80	
2400	25 KW			6.70	133	400	1,200	133.60	
2500	Diesel engine, 20 KW			4.40	96.50	290	870	93.20	
2600	50 KW			9.55	113	340	1,025	144.40	
2700	100 KW			14	157	470	1,400	206	
2800	250 KW			43.45	277	830	2,500	513.60	
2850	Hammer, hydraulic, for mounting on boom, to 500 ft.-lb.			1.05	110	330	990	74.40	
2860	500 to 1200 ft.-lb.			2.30	223	670	2,000	152.40	
2900	Heaters, space, oil or electric, 50 MBH			.93	22.50	67	201	20.85	
3000	100 MBH			1.66	29	87	261	30.70	
3100	300 MBH			5.33	43.50	130	390	68.65	
3150	500 MBH			10.68	58.50	175	525	120.45	
3200	Hose, water, suction with coupling, 20' long, 2" diameter			.01	8.35	25	75	5.10	
3210	3" diameter			.02	12.65	38	114	7.75	
3220	4" diameter			.03	16.65	50	150	10.25	
3230	6" diameter			.06	31.50	95	285	19.50	
3240	8" diameter			.31	51.50	154	460	33.30	
3250	Discharge hose with coupling, 50' long, 2" diameter			.01	7	21	63	4.30	
3260	3" diameter			.02	8.65	26	78	5.35	
3270	4" diameter			.03	11.65	35	105	7.25	
3280	6" diameter			.05	28.50	85	255	17.40	
3290	8" diameter			.34	56.50	169	505	36.50	
3300	Ladders, extension type, 16' to 36' long			.14	21	63	189	13.70	
3400	40' to 60' long			.19	31	93	279	20.10	
3410	Level, laser type, for pipe laying, self leveling			1.35	90	270	810	64.80	
3430	Manual leveling			.69	54.50	164	490	38.30	
3440	Rotary beacon with rod and sensor			.90	75	225	675	52.20	
3460	Builders level with tripod and rod			.09	22.50	68	204	14.30	
3500	Light towers, towable, with diesel generator, 2000 watt			1.75	93.50	280	840	70	
3600	4000 watt			1.90	108	325	975	80.20	
3700	Mixer, powered, plaster and mortar, 6 C.F., 7 H.P.			1.10	55.50	167	500	42.20	
3800	10 C.F., 9 H.P.			1.30	78.50	235	705	57.40	
3850	Nailer, pneumatic			.43	28.50	85	255	20.45	
3900	Paint sprayers complete, 8 CFM			.64	42.50	127	380	30.50	
4000	17 CFM			.94	62.50	188	565	45.10	
4020	Pavers, bituminous, rubber tires, 8' wide, 52 H.P., gas			14.45	770	2,315	6,950	578.60	
4030	8' wide, 64 H.P., diesel			23.20	1,150	3,455	10,400	876.60	
4050	Crawler, 10' wide, 78 H.P., gas			25.95	1,375	4,105	12,300	1,029	
4060	10' wide, 87 H.P., diesel			32.70	1,725	5,140	15,400	1,290	
4070	Concrete paver, 12' to 24' wide, 250 H.P.			35.20	1,275	3,815	11,400	1,045	

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01590 | Equipment Rental

01590 Equipment Rental			UNIT	HOURLY OPER. COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY	
400	4080	Placer-spreader-trimmer, 24' wide, 300 H.P.	Ea.	43.60	1,825	5,510	16,500	1,451	400
	4100	Pump, centrifugal gas pump, 1-1/2", 4 MGPH	R02250 -450	1	33.50	100	300	28	
	4200	2", 8 MGPH	R02250 -400	1.55	38.50	115	345	35.40	
	4300	3", 15 MGPH	R02250 -400	1.75	41.50	125	375	39	
	4400	6", 90 MGPH	R02315 -300	11.90	172	515	1,550	198.20	
	4500	Submersible electric pump, 1-1/4", 55 GPM		.35	29.50	88	264	20.40	
	4600	1-1/2", 83 GPM		.41	33.50	100	300	23.30	
	4700	2", 120 GPM		.57	41.50	125	375	29.55	
	4800	3", 300 GPM		.97	51.50	155	465	38.75	
	4900	4", 560 GPM		6.26	96.50	290	870	108.10	
	5000	6", 1590 GPM		9.07	187	560	1,675	184.55	
	5100	Diaphragm pump, gas, single, 1-1/2" diameter		.70	33.50	100	300	25.60	
	5200	2" diameter		.95	41.50	125	375	32.60	
	5300	3" diameter		.90	45	135	405	34.20	
	5400	Double, 4" diameter		2.10	86.50	260	780	68.80	
	5500	Trash pump, self-priming, gas, 2" diameter		2.10	33	99	297	36.60	
	5600	Diesel, 4" diameter		3.40	76.50	230	690	73.20	
	5650	Diesel, 6" diameter		8.40	125	375	1,125	142.20	
	5660	Rollers, see division 01590-200							
	5700	Salamanca, L.P. gas fired, 100,000 B.T.U.	Ea.	1.66	17	51	153	23.50	
	5705	50,000 BTU		1.24	11.35	34	102	16.70	
	5720	Sandblaster, portable, open top, 3 C.F. capacity		.15	42.50	128	385	26.80	
	5730	6 C.F. capacity		.25	61.50	185	555	39	
	5740	Accessories for above		.10	17.35	52	156	11.20	
	5750	Sander, floor		.72	32.50	97	291	25.15	
	5760	Edger		.49	21.50	65	195	16.90	
	5800	Saw, chain, gas engine, 18" long		.48	50	150	450	33.85	
	5900	36" long		.20	63.50	190	570	39.60	
	5950	60" long		.20	72.50	218	655	45.20	
	6000	Masonry, table mounted, 14" diameter, 5 H.P.		1.31	56.50	170	510	44.50	
	6050	Saw, portable cut-off, 8 H.P.		1.15	46	138	415	36.80	
	6100	Circular, hand held, electric, 7-1/4" diameter		.18	18.65	56	168	12.65	
	6200	12" diameter		.24	26.50	80	240	17.90	
	6275	Shot blaster, walk behind, 20" wide		1.05	275	825	2,475	173.40	
	6300	Steam cleaner, 100 gallons per hour		1.15	65	195	585	48.20	
	6310	200 gallons per hour		1.80	80	240	720	62.40	
	6340	Tar Kettle/Pot, 400 gallon		2.72	66.50	200	600	61.75	
	6350	Torch, cutting, acetylene-oxygen, 150' hose		1.50	26.50	80	240	28	
	6360	Hourly operating cost includes tips and gas		4.25				34	
	6410	Toilet, portable chemical		.10	16.65	50	150	10.80	
	6420	Recycle flush type		.12	20.50	62	186	13.35	
	6430	Toilet, fresh water flush, garden hose,		.14	23.50	70	210	15.10	
	6440	Hoisted, non-flush, for high rise		.12	20.50	61	183	13.15	
	6450	Toilet, trailers, minimum		.21	34.50	104	310	22.50	
	6460	Maximum		.62	104	312	935	67.35	
	6470	Trailer, office, see division 01520-500							
	6500	Trailers, platform, flush deck, 2 axle, 25 ton capacity	Ea.	3.40	105	315	945	90.20	
	6600	40 ton capacity		4.60	190	570	1,700	150.80	
	6700	3 axle, 50 ton capacity		5.05	210	630	1,900	166.40	
	6800	75 ton capacity		6.50	277	830	2,500	218	
	6850	Trailer, storage, see division 01520-500							
	6900	Water tank, engine driven discharge, 5000 gallons	Ea.	5.55	198	595	1,775	163.40	
	7000	10,000 gallons		7.80	280	840	2,525	230.40	
	7020	Transit (builder's level) with tripod		.09	21.50	65	195	13.70	
	7030	Trench box, 3000 lbs. 6'x8'		.47	78.50	235	705	50.75	
	7040	7200 lbs. 6'x20'		1.03	171	514	1,550	111.05	
	7050	8000 lbs., 8' x 16'		.85	142	426	1,275	92	
	7060	9500 lbs., 8'x20'		1.48	247	740	2,225	159.85	

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01590 | Equipment Rental

			UNIT	HOURLY OPER. COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY	
400	7065	11,000 lbs., 8'x24'	R02250 -450	Ea.	1.36	227	682	2,050	147.30
	7070	12,000 lbs., 10' x 20'			2.55	340	1,025	3,075	225.40
	7100	Truck, pickup, 3/4 ton, 2 wheel drive	R02250 -400		5.50	66.50	200	600	84
	7200	4 wheel drive			5.65	75	225	675	90.20
	7250	Crew carrier, 9 passenger	R02315 -300		3.80	85	255	765	81.40
	7290	Tool van, 24,000 G.V.W.			6.49	103	310	930	113.90
	7300	Tractor, 4 x 2, 30 ton capacity, 195 H.P.			13.85	300	905	2,725	291.80
	7410	250 H.P.			18.85	380	1,140	3,425	378.80
	7500	6 x 2, 40 ton capacity, 240 H.P.			17.45	405	1,220	3,650	383.60
	7600	6 x 4, 45 ton capacity, 240 H.P.			21.15	475	1,430	4,300	455.20
	7620	Vacuum truck, hazardous material, 2500 gallon			6.60	305	919	2,750	236.60
	7625	5,000 gallon			7.15	410	1,225	3,675	302.20
	7650	Vacuum, H.E.P.A., 16 gal., wet/dry			27	43.50	130	390	28.15
	7655	55 gal, wet/dry			60	51.50	154	460	35.60
	7690	Large production vacuum loader, 3150 CFM			15.28	615	1,840	5,525	490.25
	7700	Welder, electric, 200 amp			3.73	50	150	450	59.85
	7800	300 amp			5.27	63	189	565	79.95
	7900	Gas engine, 200 amp			5.50	48.50	145	435	73
	8000	300 amp			6.45	61.50	185	555	88.60
	8100	Wheelbarrow, any size			.06	10.35	31	93	6.70
	8200	Wrecking ball, 4000 lb.			.50	71.50	215	645	47
600	0010	LIFTING AND HOISTING EQUIPMENT RENTAL	R01590 -150						
	0100	without operators							
	0150	Crane, flatbed mntd, 3 ton cap.	R01590 -100	Ea.	8.95	223	670	2,000	205.60
	0200	Crane, climbing, 106' jib, 6000 lb. capacity, 410 FPM			41.15	1,275	3,830	11,500	1,095
	0300	101' jib, 10,250 lb. capacity, 270 FPM	R02315 -450		46.25	1,625	4,850	14,600	1,340
	0400	Tower, static, 130' high, 106' jib,							
	0500	6200 lb. capacity at 400 FPM		Ea.	44.15	1,475	4,430	13,300	1,239
	0600	Crawler, cable, 1/2 C.Y., 15 tons at 12' radius			4.97	455	1,360	4,075	311.75
	0700	3/4 C.Y., 20 tons at 12' radius			22.76	535	1,600	4,800	502.10
	0800	1 C.Y., 25 tons at 12' radius			30.35	665	1,990	5,975	640.80
	0900	Crawler mounted, lattice boom, 1-1/2 C.Y., 40 tons at 12' radius			31.15	935	2,800	8,400	809.20
	1000	2 C.Y., 50 tons at 12' radius			41.90	1,150	3,460	10,400	1,027
	1100	3 C.Y., 75 tons at 12' radius			45.10	1,225	3,710	11,100	1,103
	1200	100 ton capacity, standard boom			54.40	1,575	4,740	14,200	1,383
	1300	165 ton capacity, standard boom			79.70	2,700	8,115	24,300	2,261
	1400	200 ton capacity, 150' boom			81.45	2,800	8,400	25,200	2,332
	1500	450' boom			119.60	3,825	11,440	34,300	3,245
	1600	Truck mounted, lattice boom, 6 x 4, 20 tons at 10' radius			19.32	725	2,170	6,500	588.55
	1700	25 tons at 10' radius			24.63	965	2,890	8,675	775.05
	1800	8 x 4, 30 tons at 10' radius			29.10	760	2,280	6,850	688.80
	1900	40 tons at 12' radius			34.95	945	2,840	8,525	847.60
	2000	8 x 4, 60 tons at 15' radius			39.56	1,175	3,540	10,600	1,024
	2050	82 tons at 15' radius			42.83	1,650	4,940	14,800	1,331
	2100	90 tons at 15' radius			46.38	1,750	5,250	15,800	1,421
	2200	115 tons at 15' radius			51.75	1,875	5,590	16,800	1,532
	2300	150 tons at 18' radius			56.90	2,050	6,175	18,500	1,690
	2350	165 tons at 18' radius			64.15	2,400	7,225	21,700	1,958
	2400	Truck mounted, hydraulic, 12 ton capacity			31.70	590	1,770	5,300	607.60
	2500	25 ton capacity			33.10	765	2,300	6,900	724.80
	2550	33 ton capacity			35.80	950	2,855	8,575	857.40
	2600	55 ton capacity			41.55	1,075	3,200	9,600	972.40
	2700	80 ton capacity			55.70	1,525	4,550	13,700	1,356
	2720	100 ton capacity			68.15	2,125	6,410	19,200	1,827
	2740	120 ton capacity			72.05	2,300	6,870	20,600	1,950
	2760	150 ton capacity			76.35	2,625	7,890	23,700	2,189
	2800	Self-propelled, 4 x 4, with telescoping boom, 5 ton			13.55	345	1,035	3,100	315.40

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01590 Equipment Rental			UNIT	HOURLY OPER. COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY	
600	2900	12-1/2 ton capacity	R01590-150	Ea.	20.15	520	1,560	4,675	473.20
	3050	20 ton capacity			22.80	645	1,930	5,800	568.40
	3100	25 ton capacity			24.80	720	2,155	6,475	629.40
	3150	40 ton capacity	R01590-100		44.10	1,050	3,140	9,425	960.80
	3200	Derricks, guy, 20 ton capacity, 60' boom, 75' mast			12.07	315	938	2,825	284.15
	3300	100' boom, 115' mast	R02315-450		19.59	540	1,620	4,850	480.70
	3400	Stiffleg, 20 ton capacity, 70' boom, 37' mast			13.97	405	1,210	3,625	353.75
	3500	100' boom, 47' mast			21.97	655	1,960	5,875	567.75
	3550	Helicopter, small, lift to 1250 lbs. maximum, w/pilot			64.13	2,525	7,590	22,800	2,031
	3600	Hoists, chain type, overhead, manual, 3/4 ton			.05	5.35	16	48	3.60
	3900	10 ton			.25	24.50	73	219	16.60
	4000	Hoist and tower, 5000 lb. cap., portable electric, 40' high			4.03	180	541	1,625	140.45
	4100	For each added 10' section, add			.08	14	42	126	9.05
	4200	Hoist and single tubular tower, 5000 lb. electric, 100' high			5.43	252	755	2,275	194.45
	4300	For each added 6'-6" section, add			.14	24	72	216	15.50
	4400	Hoist and double tubular tower, 5000 lb., 100' high			5.81	277	831	2,500	212.70
	4500	For each added 6'-6" section, add			.16	26.50	79	237	17.10
	4550	Hoist and tower, mast type, 6000 lb., 100' high			6.29	287	862	2,575	222.70
	4570	For each added 10' section, add			.10	17.35	52	156	11.20
	4600	Hoist and tower, personnel, electric, 2000 lb., 100' @ 125 FPM			12.77	765	2,290	6,875	560.15
	4700	3000 lb., 100' @ 200 FPM			14.65	865	2,600	7,800	637.20
	4800	3000 lb., 150' @ 300 FPM			16.20	970	2,910	8,725	711.60
	4900	4000 lb., 100' @ 300 FPM			16.83	990	2,970	8,900	728.65
	5000	6000 lb., 100' @ 275 FPM			18.24	1,050	3,120	9,350	769.90
	5100	For added heights up to 500', add		L.F.	.01	1.67	5	15	1.10
	5200	Jacks, hydraulic, 20 ton		Ea.	.05	12.35	37	111	7.80
	5500	100 ton			.15	35	105	315	22.20
	6000	Jacks, hydraulic, climbing with 50' jackrods							
	6010	and control consoles, minimum 3 mo. rental							
	6100	30 ton capacity		Ea.	1.56	104	311	935	74.70
	6150	For each added 10' jackrod section, add			.05	3.33	10	30	2.40
	6300	50 ton capacity			2.50	167	500	1,500	120
	6350	For each added 10' jackrod section, add			.06	4	12	36	2.90
6500	125 ton capacity			6.50	435	1,300	3,900	312	
6550	For each added 10' jackrod section, add			.45	29.50	89	267	21.40	
6600	Cable jack, 10 ton capacity with 200' cable			1.30	86.50	260	780	62.40	
6650	For each added 50' of cable, add			.14	9	27	81	6.50	
700	0010	WELLPOINT EQUIPMENT RENTAL See also division 02240	R02240-800						
	0020	Based on 2 months rental							
	0100	Combination jetting & wellpoint pump, 60 H.P. diesel		Ea.	8.69	257	770	2,300	223.50
	0200	High pressure gas jet pump, 200 H.P., 300 psi			15.61	219	658	1,975	256.50
	0300	Discharge pipe, 8" diameter		L.F.	.01	.41	1.24	3.72	.35
	0350	12" diameter			.01	.61	1.84	5.50	.45
	0400	Header pipe, flows up to 150 G.P.M., 4" diameter			.01	.38	1.14	3.42	.30
	0500	400 G.P.M., 6" diameter			.01	.44	1.33	3.99	.35
	0600	800 G.P.M., 8" diameter			.01	.61	1.84	5.50	.45
	0700	1500 G.P.M., 10" diameter			.01	.65	1.94	5.80	.45
	0800	2500 G.P.M., 12" diameter			.02	1.22	3.67	11	.90
	0900	4500 G.P.M., 16" diameter			.02	1.56	4.69	14.05	1.10
	0950	For quick coupling aluminum and plastic pipe, add			.02	1.62	4.85	14.55	1.15
	1100	Wellpoint, 25' long, with fittings & riser pipe, 1-1/2" or 2" diameter		Ea.	.05	3.23	9.69	29	2.35
	1200	Wellpoint pump, diesel powered, 4" diameter, 20 H.P.			4.21	148	444	1,325	122.50
	1300	6" diameter, 30 H.P.			5.51	184	551	1,650	154.30
	1400	8" suction, 40 H.P.			7.49	252	755	2,275	210.90
1500	10" suction, 75 H.P.			10.30	294	882	2,650	258.80	
1600	12" suction, 100 H.P.			15.37	470	1,410	4,225	404.95	
1700	12" suction, 175 H.P.			20.55	520	1,560	4,675	476.40	

Exhibit 8

01500 | Temporary Facilities & Controls

01590 | Equipment Rental



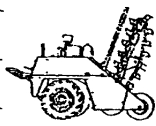
01590 Equipment Rental			UNIT	HOURLY OPER. COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY		
200	3200	Pneumatic tire diesel roller, 12 ton	RO1590-100	Ea.	6.10	315	945	2,825	237.80	200
	3250	21 to 25 ton			10.25	590	1,775	5,325	437	
	3300	Sheepsfoot roller, self-propelled, 4 wheel, 130 H.P.	RO2315-300		29.80	875	2,630	7,900	764.40	
	3320	300 H.P.			41.55	975	2,930	8,800	918.40	
	3350	Vibratory steel drum & pneumatic tire, diesel, 18,000 lb.	RO2315-400		11.30	355	1,065	3,200	303.40	
	3400	29,000 lb.			18.95	470	1,415	4,250	434.60	
	3450	Scrapers, towed type, 9 to 12 C.Y. capacity	RO2315-450		3.37	161	482	1,450	123.35	
	3500	12 to 17 C.Y. capacity			3.58	214	643	1,925	157.25	
	3550	Scrapers, self-propelled, 4 x 4 drive, 2 engine, 14 C.Y. capacity	RO2465-900		69.40	1,450	4,320	13,000	1,419	
	3600	2 engine, 24 C.Y. capacity			101.35	2,275	6,815	20,400	2,174	
	3650	Self-loading, 11 C.Y. capacity			31.35	825	2,470	7,400	744.80	
	3700	22 C.Y. capacity			61.35	1,475	4,410	13,200	1,373	
	3710	Screening plant 110 hp. w/ 5' x 10' screen			15.85	370	1,115	3,350	349.80	
	3720	5' x 16' screen			17.20	475	1,420	4,250	421.60	
	3850	Shovels, see Cranes division 01590-600								
	3860	Shovel/backhoe bucket, 1/2 C.Y.		Ea.	.85	53.50	160	480	38.80	
	3870	3/4 C.Y.			.85	61.50	185	555	43.80	
	3880	1 C.Y.			.90	71.50	215	645	50.20	
	3890	1-1/2 C.Y.			1	170	510	1,525	110	
	3910	3 C.Y.			1.15	305	920	2,750	193.20	
	4110	Tractor, crawler, with bulldozer, torque converter, diesel 75 H.P.			12.15	325	970	2,900	291.20	
	4150	105 H.P.			17.20	490	1,475	4,425	432.60	
	4200	140 H.P.			19.80	510	1,530	4,600	464.40	
	4260	200 H.P.			29.80	975	2,925	8,775	823.40	
	4310	300 H.P.			39.20	1,200	3,600	10,800	1,034	
	4360	410 H.P.			53.65	1,575	4,725	14,200	1,374	
	4380	700 H.P.			109.65	3,400	10,235	30,700	2,924	
	4400	Loader, crawler, torque conv., diesel, 1-1/2 C.Y., 80 H.P.			9.70	310	930	2,800	263.60	
	4450	1-1/2 to 1-3/4 C.Y., 95 H.P.			11.70	380	1,145	3,425	322.60	
	4510	1-3/4 to 2-1/4 C.Y., 130 H.P.			16.05	615	1,850	5,550	498.40	
	4530	2-1/2 to 3-1/4 C.Y., 190 H.P.			23.20	840	2,525	7,575	690.60	
	4560	3-1/2 to 5 C.Y., 275 H.P.			31.15	1,200	3,610	10,800	971.20	
	4610	Tractor loader, wheel, torque conv., 4 x 4, 1 to 1-1/4 C.Y., 65 H.P.			10.05	223	670	2,000	214.40	
	4620	1-1/2 to 1-3/4 C.Y., 80 H.P.			11.05	315	940	2,825	276.40	
	4650	1-3/4 to 2 C.Y., 100 H.P.			11.55	335	1,000	3,000	292.40	
	4710	2-1/2 to 3-1/2 C.Y., 130 H.P.			14.55	425	1,270	3,800	370.40	
	4730	3 to 4-1/2 C.Y., 170 H.P.			18.10	565	1,700	5,100	484.80	
	4760	5-1/4 to 5-3/4 C.Y., 270 H.P.			32.95	855	2,570	7,700	777.60	
	4810	7 to 8 C.Y., 375 H.P.			50.20	1,100	3,305	9,925	1,063	
	4870	12-1/2 C.Y., 690 H.P.			93.50	2,350	7,015	21,000	2,151	
	4880	Wheeled, skid steer, 10 C.F., 30 H.P. gas			5.85	140	420	1,250	130.80	
	4890	1 C.Y., 78 H.P., diesel			7.60	223	670	2,000	194.80	
	4891	Attachments for all skid steer loaders								
	4892	Auger		Ea.	.46	77.50	232	695	50.10	
	4893	Backhoe			.64	107	320	960	69.10	
	4894	Broom			.66	110	331	995	71.50	
	4895	Forks			.21	34.50	104	310	22.50	
	4896	Grapple			.54	90	270	810	58.30	
	4897	Concrete hammer			1.03	171	513	1,550	110.85	
	4898	Tree spade			.94	157	471	1,425	101.70	
	4899	Trencher			.71	119	356	1,075	76.90	
	4900	Trencher, chain, boom type, gas, operator walking, 12 H.P.			2	117	350	1,050	86	
	4910	Operator riding, 40 H.P.			5.75	245	735	2,200	193	
	5000	Wheel type, diesel, 4' deep, 12" wide			12.80	645	1,930	5,800	488.40	
	5100	Diesel, 6' deep, 20" wide			23.70	940	2,820	8,450	753.60	
	5150	Ladder type, diesel, 5' deep, 8" wide			14.80	505	1,510	4,525	420.40	
	5200	Diesel, 8' deep, 16" wide			32.45	985	2,950	8,850	849.60	
	5250	Truck, dump, tandem, 12 ton payload			19.90	325	970	2,900	353.20	

Exhibit 9

01500 | Temporary Facilities & Controls

01590 | Equipment Rental

		UNIT	HOURLY OPER. COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY
0700	3/4 C.Y., 20 tons at 12' radius		22.76	535	1,600	4,800	502.10
0800	1 C.Y., 25 tons at 12' radius		30.35	665	1,990	6,400	640.80
0900	Crawler mounted, lattice boom, 1-1/2 C.Y., 40 tons at 12' radius		31.15	935	2,800	8,400	809.20
1000	2 C.Y., 50 tons at 12' radius		41.90	1,150	3,460	10,400	1,108
1100	3 C.Y., 75 tons at 12' radius		45.10	1,225	3,740	11,100	1,363
1200	100 ton capacity, standard boom		54.40	1,575	4,740	14,200	2,261
1300	165 ton capacity, standard boom		79.70	2,700	8,115	24,300	2,332
1400	200 ton capacity, 150' boom		81.45	2,800	8,400	25,200	3,245
1500	450' boom		119.60	3,825	11,440	34,300	

Crews

Crew No.	Bare Costs		Incl. Subs. & P.		Cost Per Labor-Hour	
	Nr.	Daily	Nr.	Daily	Bare Costs	Incl. O&P
Crew B-120						
1 Equip. Oper. (crane)		\$32.35		\$258.00	\$48.90	\$391.20
1 Equip. Oper. (hoist)		26.65		213.00	40.25	322.00
1 Power Shovel, 1 C.Y.				640.80		781.90
1 FE. Attachment, 1 C.Y.				50.20	55.20	43.19
16 L.H., Daily Totals		\$1163.00		\$1473.30	\$72.69	\$92.09
Crew B-120						
1 Equip. Oper. (crane)		\$32.35		\$258.00	\$48.90	\$391.20
1 Equip. Oper. (hoist)		26.65		213.00	40.25	322.00
1 Power Shovel, 1.5 C.Y.				809.20		890.10
1 FE. Attachment, 1.5 C.Y.				110.00	121.00	57.45
16 L.H., Daily Totals		\$1391.20		\$1724.30	\$86.95	\$107.78

Exhibit ~~10~~ 10

Means

Means Heavy Construction Handbook

A practical guide to:

- Estimating and Accounting Methods
- Operations/Equipment Requirements
- Hazardous Site Evaluation/Remediation



Richard C. Ringwald, PE



Means Heavy Construction Handbook

A practical guide to:

- Estimating and Accounting Methods*
- Operations/Equipment Requirements*
- Hazardous Site Evaluation/Remediation*

Richard C. Ringwald, PE

Contributing Author: Francis J. Hopcroft, PE

Chapter 27

Power Shovels and Off-Road Haulers

Shovels Certainly scrapers are the dominant method of moving earth on larger jobs, but there are other special situation earthmovers with which the heavy construction manager must also be familiar. Among these, the power shovel is the most used.

Scrapers could be considered *surface* excavators since they fill their bowls from the surface of an earth mass. In Chapter 29, subsurface excavators, like the familiar backhoe, are discussed. That leaves *above surface* machines, like the shovel and endloader, that reach for a load above the surface they rest on.

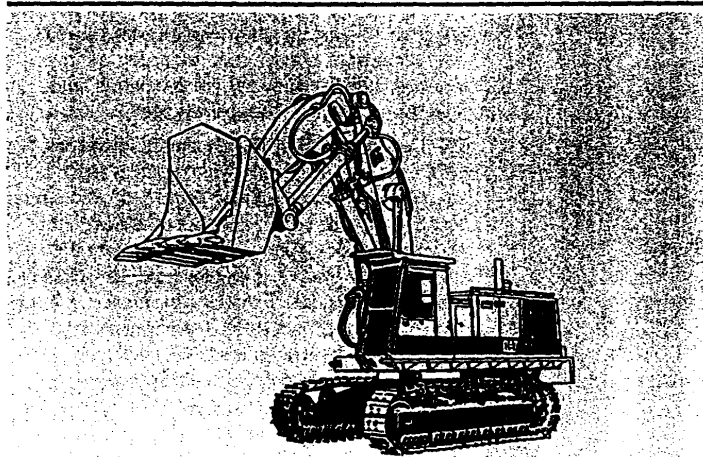
Power shovels are primarily used for earth, sidehill cuts; unrippable, blasted, solid rock cuts; and mixed rock/large boulder/earth cuts, none of which lend themselves to efficient scraper loading.

The power shovel (Figure 27.1) almost always has a crawler undercarriage plus two front arms and a digging bucket which is thrust ("crowded") into a near vertical face of soil or blasted rock pile. Ideally, the working face is of "optimum depth," whereby the bucket will be 100% filled by one complete, vertical pass through the face without undue crowding. If the face is higher than optimum, a shelf will develop above the machine reach which will eventually collapse onto the surface and retard, or even endanger, the operation. Similarly, if the cut is too shallow, the shovel will have to make more than one pass to get a bucketful. (Note: optimum depth does not apply to blasted rock.)

The shovel swings the bucket, and dumps it into the target hauler, usually an off-road hauler or – an ordinary dump truck. The greater the swing angle traversed by the bucket, the greater the swing time needed.

Shovel size ratings are based on the LCY (struck and heaped) capacity of the bucket that the machine can handle efficiently. As with many other types of heavy equipment, there is a transportability problem once a certain size is exceeded. Shovels over $\frac{3}{4}$ to 1 LCY in size are too wide and/or too heavy to be hauled on trailers over public highways, and therefore, have to be partially dismantled first, then reassembled at the destination. This process is too costly for short duration projects.

Most shovels have the same engine, cab, and undercarriages as a similarly-rated crane or backhoe.



(Courtesy Caterpillar Corporation)

Power Shovel

Figure 27.1

Thus, the front arms and bucket can be removed, and a crane boom or backhoe front-mounted in its place.

Off-Road Haulers

Off-road haulers serve shovels, endloaders, or other loading machines when standard dump trucks are too small or too lightly built to do the job. Most large excavation projects require the use of rough, unpaved, job-site roads and loading of large rock, and thus are too much for ordinary dump trucks to handle. There are two types of off-road haulers. The rear-dump, (Figure 27.2) essentially a very heavy dump truck, is best-suited for rock and sticky soils. The bottom-dump (or "belly" dump) (Figure 27.3) discharges its load by opening under-mounted, longitudinal gates. It is best suited for dry, fast-moving materials. It leaves a longer, lower pile than a rear-dump.

Off-road haulers are rated by capacity in tons, LCY struck, and LCY heaped. The volumetric capacity can be increased by mounting side-boards, but this should not be done except to haul super-light materials such as coal. The excessive wear and tear costs, plus slower haul time engendered by exceeding the weight capacity, will not be compensated for by the extra load.

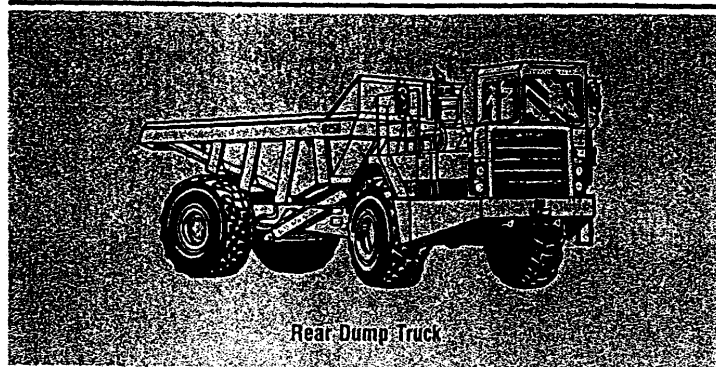


Figure 27.2

Exhibit 11

01500 | Temporary Facilities & Controls

01590 | Equipment Rental

			UNIT	HOURLY OPER. COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	CREW EQUIPMENT COST/DAY	
3200	Pneumatic tire diesel roller, 12 ton	R01590-100	EA.	6.10	315	945	2,825	237.80	200
3250	21 to 25 ton			10.25	590	1,775	5,325	437	
3300	Sheepsfoot roller, self-propelled, 4 wheel, 130 H.P.	R02315-300		29.80	875	2,630	7,900	764.40	
3320	300 H.P.			41.55	975	2,930	8,800	918.40	
3350	Vibratory steel drum & pneumatic tire, diesel, 18,000 lb.	R02315-400		11.30	355	1,065	3,200	303.40	
3400	29,000 lb.			18.95	470	1,415	4,250	434.60	
3450	Scrapers, towed type, 9 to 12 C.Y. capacity	R02315-450		3.37	161	482	1,450	123.35	
3500	12 to 17 C.Y. capacity			3.58	214	643	1,925	157.25	
3550	Scrapers, self-propelled, 4 x 4 drive, 2 engine, 14 C.Y. capacity	R02495-800		69.40	1,450	4,320	13,000	1,419	
3600	2 engine, 24 C.Y. capacity			101.35	2,275	6,815	20,400	2,174	
3650	Self-loading, 11 C.Y. capacity			31.35	825	2,470	7,400	744.80	
3700	22 C.Y. capacity			61.35	1,475	4,410	13,200	1,373	
3710	Screening plant 110 hp. w/ 5' x 10' screen			15.85	370	1,115	3,350	349.80	
3720	5' x 16' screen			17.20	475	1,420	4,250	421.60	
3850	Shovels, see Cranes division 01590-600								
3860	Shovel/backhoe bucket, 1/2 C.Y.		EA.	.85	53.50	160	480	38.80	
3870	3/4 C.Y.			.85	61.50	185	555	43.80	
3880	1 C.Y.			.90	71.50	215	645	50.20	
3890	1 1/2 C.Y.			1	170	510	1,525	110	
3910	3 C.Y.			1.15	305	920	2,750	193.20	
4110	Welder, crawler, winch, bulldozer, torque converter, diesel 75 H.P.			12.15	325	970	2,900	291.20	
4150	105 H.P.			17.20	490	1,475	4,425	432.40	
4200	140 H.P.			19.80	510	1,530	4,600	464.40	
4260	200 H.P.			29.80	975	2,925	8,775	823.40	
4310	300 H.P.			39.20	1,200	3,600	10,800	1,034	
4360	410 H.P.			53.65	1,575	4,725	14,200	1,374	
4380	700 H.P.			109.65	3,400	10,235	30,700	2,924	
4400	Loader, crawler, torque conv., diesel, 1 1/2 C.Y., 80 H.P.			9.70	310	930	2,800	263.60	
4450	1-1/2 to 1-3/4 C.Y., 95 H.P.			11.70	380	1,145	3,425	322.60	
4510	1-3/4 to 2 1/4 C.Y., 130 H.P.			16.05	615	1,850	5,550	498.40	
4530	2-1/2 to 3 1/4 C.Y., 190 H.P.			23.20	840	2,525	7,575	690.60	
4560	3-1/2 to 5 C.Y., 275 H.P.			31.15	1,200	3,610	10,800	971.20	
4610	Tractor loader, wheel, torque conv., 4 x 4, 1 to 1-1/4 C.Y., 65 H.P.			10.05	223	670	2,000	214.40	
4620	1-1/2 to 1-3/4 C.Y., 80 H.P.			11.05	315	940	2,825	276.40	
4650	1-3/4 to 2 C.Y., 100 H.P.			11.55	335	1,000	3,000	292.40	
4710	2 1/2 to 3 1/2 C.Y., 130 H.P.			14.55	425	1,270	3,800	370.40	
4730	3 to 4-1/2 C.Y., 170 H.P.			18.10	565	1,700	5,100	484.80	
4760	5-1/4 to 5-3/4 C.Y., 270 H.P.			32.95	855	2,570	7,700	777.60	
4810	7 to 8 C.Y., 375 H.P.			50.20	1,100	3,305	9,925	1,063	
4870	12-1/2 C.Y., 690 H.P.			93.50	2,350	7,015	21,000	2,151	
4880	Wooded, skid steer, 10 CF, 30 H.P. gas			5.85	140	420	1,250	130.80	
4890	1 C.Y., 78 H.P., diesel			7.60	223	670	2,000	194.80	
4891	Attachments for all skid steer loaders								
4892	Auger		EA.	.46	77.50	232	695	50.10	
4893	Backhoe			.64	107	320	960	69.10	
4894	Broom			.66	110	331	995	71.50	
4895	Forks			.21	34.50	104	310	22.50	
4896	Grapple			.54	90	270	810	58.30	
4897	Concrete hammer			1.03	171	513	1,550	110.85	
4898	Tree spade			.94	157	471	1,425	101.70	
4899	Trencher			.71	119	356	1,075	76.90	
4900	Trencher, chain, boom type, gas, operator walking, 12 H.P.			2	117	350	1,050	86	
4910	Operator riding, 40 H.P.			5.75	245	735	2,200	193	
5000	Wheel type, diesel, 4' deep, 12' wide			12.80	645	1,930	5,800	488.40	
5100	Diesel, 6' deep, 20' wide			23.70	940	2,820	8,450	753.60	
5150	Ladder type, diesel, 5' deep, 8' wide			14.80	505	1,510	4,525	420.40	
5200	Diesel, 8' deep, 16' wide			32.45	985	2,950	8,850	849.60	
5250	Truck, dump, tandem, 12 ton payload			19.90	325	970	2,900	353.20	

Exhibit 12

Means

Means Heavy Construction Handbook

A practical guide to:

- Estimating and Accounting Methods
- Operations/Equipment Requirements
- Hazardous Site Evaluation/Remediation



Richard C. Ringwald, PE



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Chapter 29

Backhoes, Draglines, Gradalls, and Trenchers

These excavators usually dig below their sitting plane, although the backhoe and gradall do have a limited capability of reaching above that surface. All can be either wheel- or crawler-mounted. All operate by pulling their buckets toward themselves rather than pushing, as is done by shovels and loaders.

Backhoes The backhoe (Figure 29.1) is the most commonly used, and horsepower for horsepower, can move the most CY/HR. It is used to cut trenches for pipe or other longitudinal structures, to dig foundations, or to do other digging that permits pulling the bucket close to the chassis. It can reach high enough to dump the bucket into many types of hauling machines (though not as efficiently as shovels/loaders). Narrow compacting devices (vibratory and impact) can be mounted in lieu of a bucket for consolidation of trench backfill or similar small area jobs. Some small endloaders can be equipped with a rear backhoe to become a versatile, small odd-job machine. A backhoe is generally rated by bucket LCY size, usually the same size as the shovel to which it can be converted. (See Chapter 16, "Trenching and Pipes," for further information on the backhoe's role in pipe work.)

Draglines The dragline is essentially a crane with cables contrived such that a dragline bucket can be used. The long reach, plus the rotation on the undercarriage, means that a large area can be excavated from one position. This feature is an